United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of Wayne County, Illinois

How To Use This Soil Survey

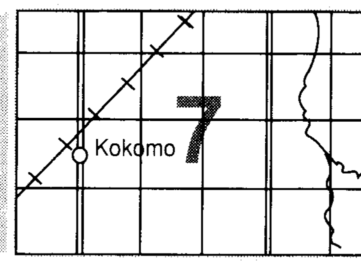
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

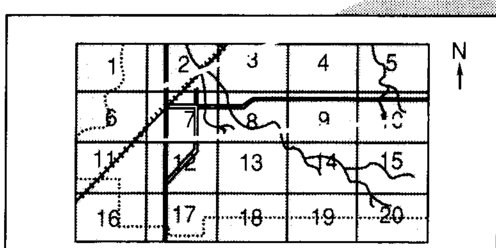
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



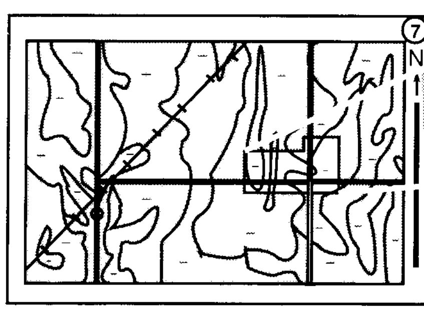
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

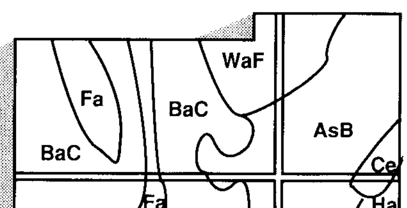


INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1988. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This survey was made cooperatively by the Natural Resources Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Wayne County Soil and Water Conservation District. Financial assistance was provided by the Wayne County Board and the Illinois Department of Agriculture.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

This soil survey is Illinois Agricultural Experiment Station Soil Report 148.

All programs and services of the Natural Resources Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: The pasture and hayland in the foreground are in an area of Ava soils. A cultivated area of Bluford soils is in the background.

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Issued August 1996

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Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Wayne County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow over bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Thomas W. Christenson
State Conservationist
Natural Resources Conservation Service

Soil Survey of Wayne County, Illinois

By Bruce Currie, Natural Resources Conservation Service

Soils surveyed by Bruce Currie and Mark Matusiak, Natural Resources Conservation Service, and Terry Pittman, Wayne County

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
the Illinois Agricultural Experiment Station

WAYNE COUNTY is in the southeastern part of Illinois (fig. 1). One of the largest counties in southern Illinois, it has a total area of 457,780 acres, or 715 square miles. It is bounded on the east by Edwards and Richland Counties, on the north by Richland and Clay Counties, on the west by Marion and Jefferson Counties, and on the south by Hamilton and White Counties. In 1980, the population of the county was 18,000. The county seat and largest town is Fairfield, which had a population of 6,200 in 1980.

This survey updates a soil survey of Wayne County published in 1931 *(6)*. It provides more recent information and has larger maps, which show the soils in greater detail.

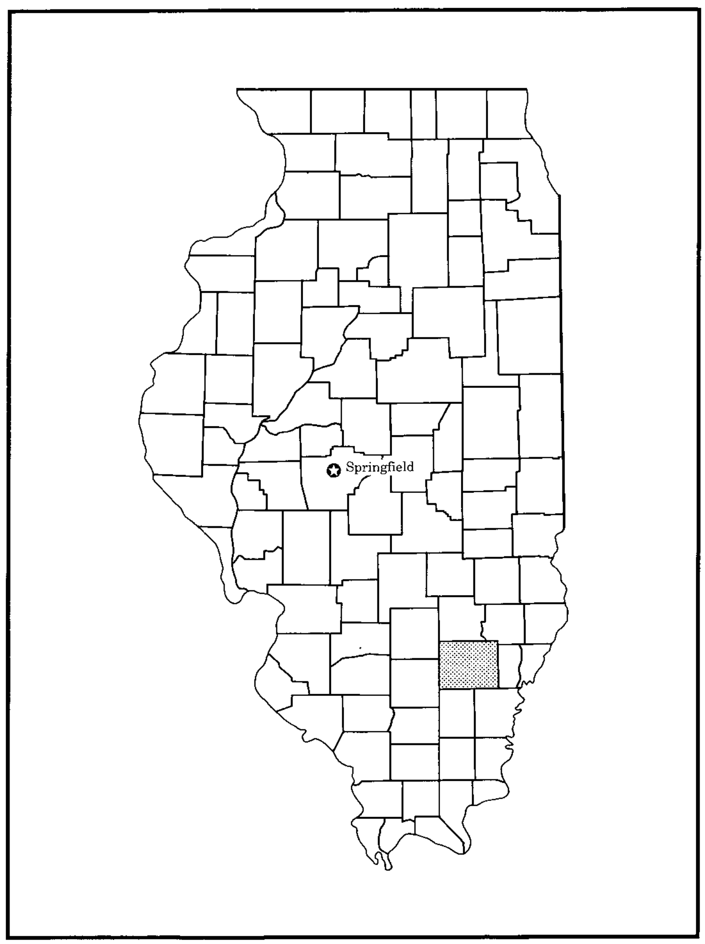

Figure 1.—Location of Wayne County in Illinois.

Climate

Wayne M. Wendland, Illinois State Water Survey, helped prepare this section.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Fairfield in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 32.2 degrees F and the average daily minimum temperature is 23.3 degrees. The lowest temperature on record, which occurred at Fairfield on January 17, 1977, is -23 degrees. In summer, the average temperature is 75 degrees and the average daily maximum temperature is 86.5 degrees. The highest recorded temperature, which occurred at Fairfield on July 14, 1954, is 108 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 44.73 inches. Of this, 23.89 inches, or 53 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 13.35 inches. The heaviest 1-day rainfall during the period of record was 6.76 inches.

The average seasonal snowfall is 13.4 inches. The greatest snow depth at any one time during the period of record was 16 inches. On the average, 21 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 62 percent. Humidity is higher at night, and the average at dawn is about 81 percent. The sun shines 74 percent of the time possible in summer and 43 percent in winter. The prevailing wind is from the south-southwest. Average windspeed is highest, 10.3 miles per hour, in March.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable

from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Bluford-Wynoose Association

Nearly level and gently sloping, somewhat poorly drained and poorly drained soils that formed in loess and in the underlying silty sediments; on uplands

This association consists mainly of soils on broad, loess-covered till plains. The loess is generally less than 4 feet thick. Slopes range from 0 to 5 percent.

This association makes up about 46 percent of the county. It is about 65 percent Bluford soils, 15 percent Wynoose soils, and 20 percent minor soils (fig. 2).

Bluford soils are nearly level and gently sloping, somewhat poorly drained, and slowly permeable. They are on broad ridges and side slopes. Typically, the surface layer is dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is pale brown, mottled, friable silt loam about 8 inches thick. The subsoil extends to a depth of more than 60 inches. It is light brownish gray, mottled silty clay loam. The upper part is firm, and the lower part is firm and brittle.

Wynoose soils are nearly level, poorly drained, and very slowly permeable. They are on broad till plains. Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is light brownish gray, mottled, friable silt loam about 13 inches thick. The subsoil extends to a depth of more than 60 inches. It is light brownish gray, mottled, and firm. The upper part is silty clay, and the lower part is silty clay loam.

Of minor extent in this association are Ava, Belknap, and Blair soils. The moderately well drained Ava soils are on ridges and side slopes. The somewhat poorly drained Belknap soils are on flood plains. They formed in alluvium. The somewhat poorly drained Blair soils are on side slopes.

Most areas of this association are used for corn, soybeans, milo, or wheat. The major soils are suited to the crops commonly grown in the county. Wetness and erosion are the main management concerns.

The major soils are generally poorly suited to dwellings and septic tank absorption fields. A seasonal high water table and slow or very slow permeability are limitations affecting these uses.

2. Ava-Blair-Hickory Association

Gently sloping to steep, somewhat poorly drained to well drained soils that formed in loess, silty and loamy sediments, and glacial till; on uplands

This association consists of gently sloping soils on ridges and gently sloping to steep soils on side slopes. Slopes range from 2 to 30 percent.

This association makes up about 16 percent of the county. It is about 40 percent Ava soils, 25 percent Blair soils, 15 percent Hickory soils, and 20 percent soils of minor extent (fig. 3).

Ava soils are gently sloping and sloping and are moderately well drained. They are moderately permeable in the upper part and very slowly permeable in the lower part. They formed in loess and in the underlying silty and loamy sediments. They are on ridges and side slopes. Typically, the surface layer is dark brown, friable silt loam about 8 inches thick. The subsurface layer is yellowish brown, friable silt loam

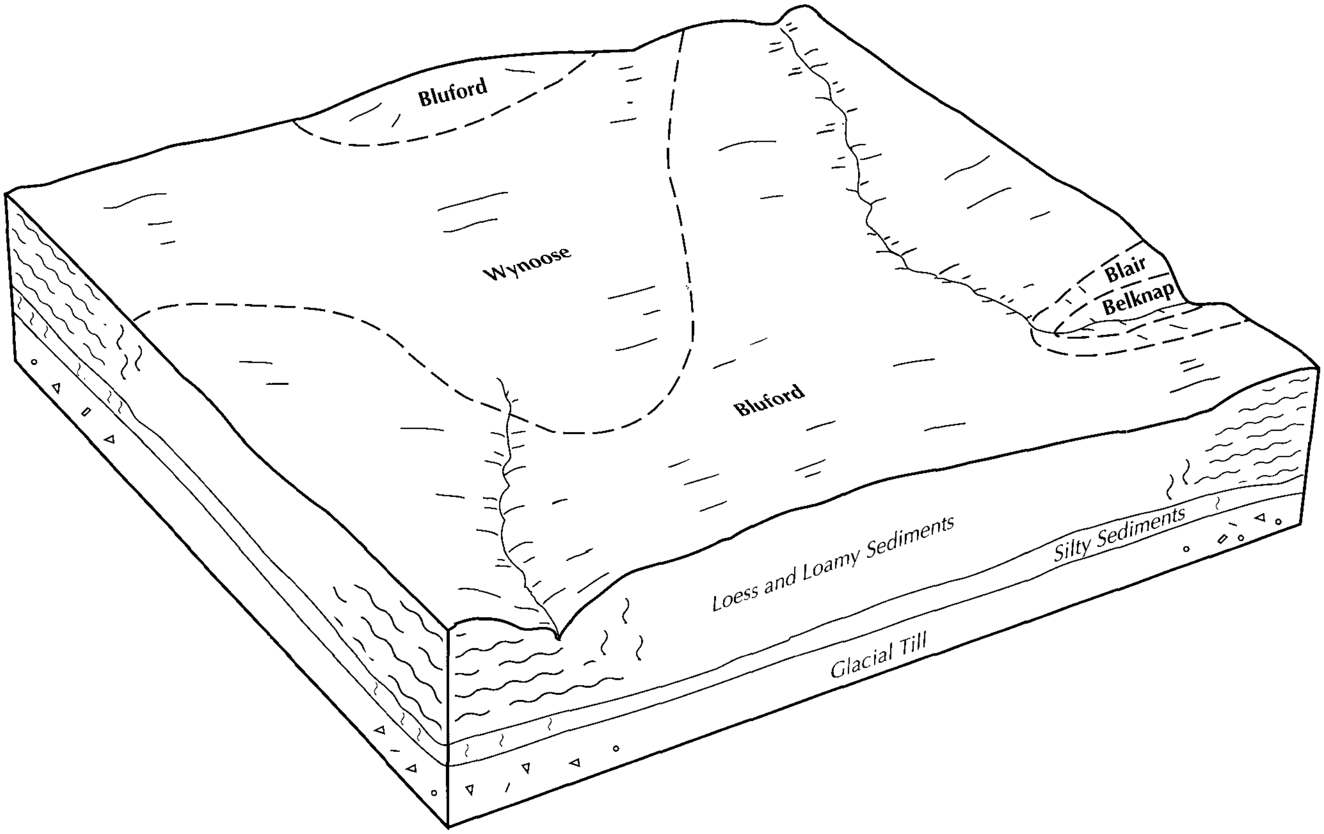

Figure 2.—Typical pattern of soils and parent material in the Bluford-Wynoose association.

about 5 inches thick. The subsoil to a depth of more than 60 inches is silty clay loam. The upper part is yellowish brown and dark yellowish brown and is firm. The next part is dark yellowish brown and yellowish brown, mottled, and firm and slightly brittle. The lower part is yellowish brown, mottled, and firm.

Blair soils are sloping, somewhat poorly drained, and moderately slowly permeable. They formed in silty and loamy sediments and in the underlying glacial till, or they formed entirely in sediments. They are on side slopes. Typically, the surface layer is mixed dark brown and yellowish brown, friable silt loam about 6 inches thick. The subsoil to a depth of more than 60 inches is clay loam. It is mottled. The upper part is yellowish brown and is friable and firm. The next part is light brownish gray and firm. The lower part is light gray and yellowish brown and is firm.

Hickory soils are strongly sloping to steep, well drained or moderately well drained, and moderately permeable. They formed in glacial till. They are on side slopes. Typically, the surface layer is dark brown, friable loam about 5 inches thick. The subsurface layer is strong brown, friable loam about 4 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is strong brown, friable loam and firm clay loam. The lower part is yellowish brown, mottled, firm loam.

Of minor extent in this association are the somewhat poorly drained Atlas, Belknap, and Bluford soils. Atlas soils formed in glacial till or accretion gley that contains a paleosol. They are on side slopes. Belknap soils formed in alluvium. They are on flood plains. Bluford soils formed in loess and in the underlying silty sediments. They are on broad ridges and side slopes.

This association is used mainly for cultivated crops, hay, pasture, or woodland. The less sloping areas are suited to crop production. The association is suited to woodland. The slope and the hazard of erosion are management concerns in wooded areas.

The major soils are generally poorly suited to dwellings and septic tank absorption fields. The steeper soils are limited because of the slope. The less sloping areas are limited because of slow permeability, wetness, and the shrink-swell potential.

3. Cisne-Hoyleton Association

Nearly level and gently sloping, poorly drained and somewhat poorly drained soils that formed in loess and in the underlying silty and loamy sediments; on uplands

This association consists of moderately dark soils on broad, loess-covered till plains. The loess is generally less than 4 feet thick. Slopes range from 0 to 5 percent.

This association makes up about 4 percent of the county. It is about 40 percent Cisne soils, 40 percent Hoyleton soils, and 20 percent minor soils (fig. 4).

Cisne soils are nearly level, poorly drained, and very slowly permeable. They are on broad till plains. Typically, the surface layer is dark brown, friable silt loam about 9 inches thick. The subsurface layer is light brownish gray and light gray, mottled, friable silt loam about 11 inches thick. The subsoil extends to a depth of more than 60 inches. It is light brownish gray, mottled, and firm. The upper part is silty clay, and the lower part is silty clay loam.

Hoyleton soils are nearly level and gently sloping, somewhat poorly drained, and slowly permeable. They are on ridges and knolls. Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsoil extends to a depth of more than 60 inches. It is mottled. The upper part is brown, friable silt loam. The next part is light yellowish brown and brown, firm silty clay loam. The lower part is yellowish brown and pale brown, friable and firm silt loam and loam.

Of minor extent in this association are Ava, Bluford, and Wynoose soils. These soils have a lighter colored surface layer than that of the Cisne and Hoyleton soils. The moderately well drained Ava soils are on ridges and side slopes. The somewhat poorly drained Bluford soils are on broad ridges and side slopes. The poorly drained Wynoose soils are on broad till plains.

Most areas of this association are used for cultivated crops. These soils are suited to the crops commonly grown in the county. The main management needs are measures that maintain the drainage system in the nearly level areas and that control erosion in the gently sloping areas.

The major soils generally are poorly suited to dwellings and septic tank absorption fields. A seasonal

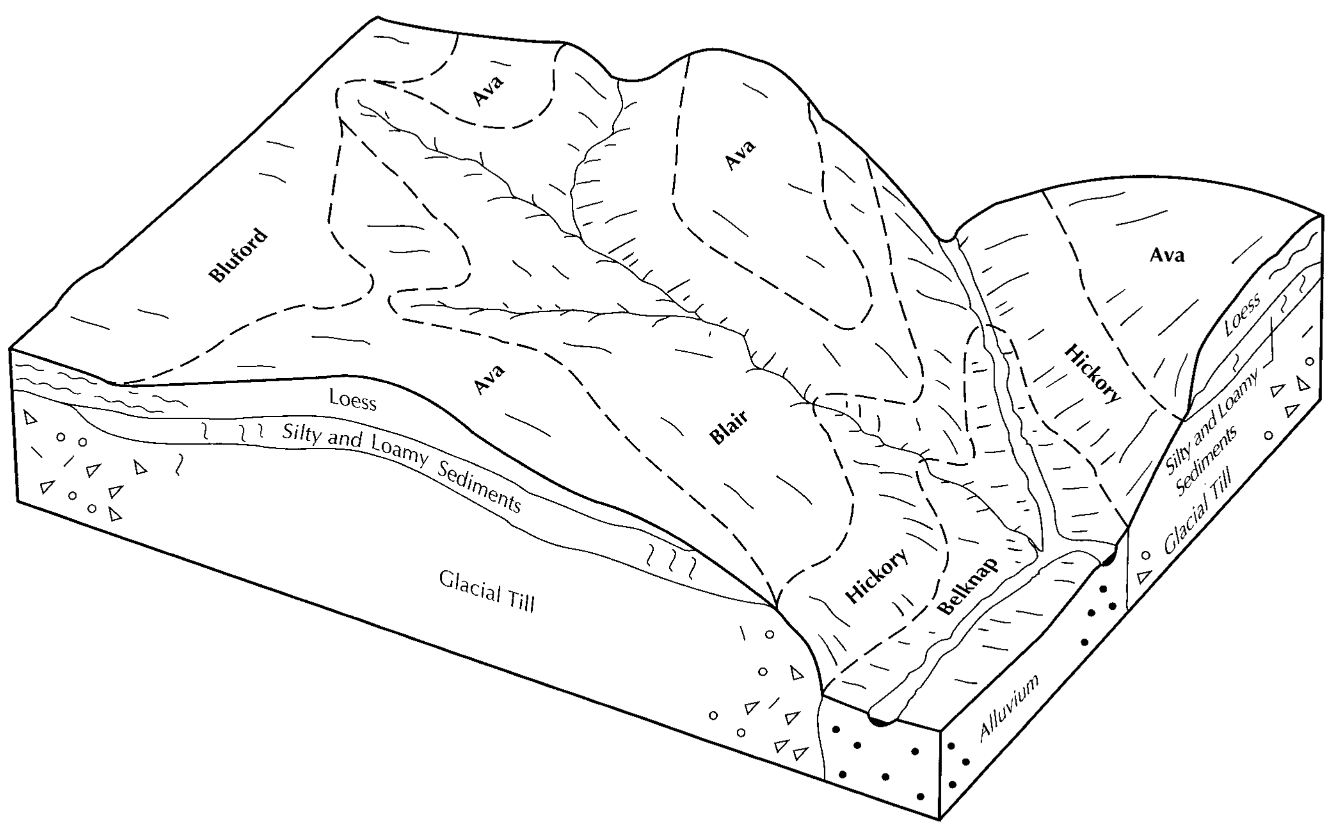

Figure 3.—Typical pattern of soils and parent material in the Ava-Blair-Hickory association.

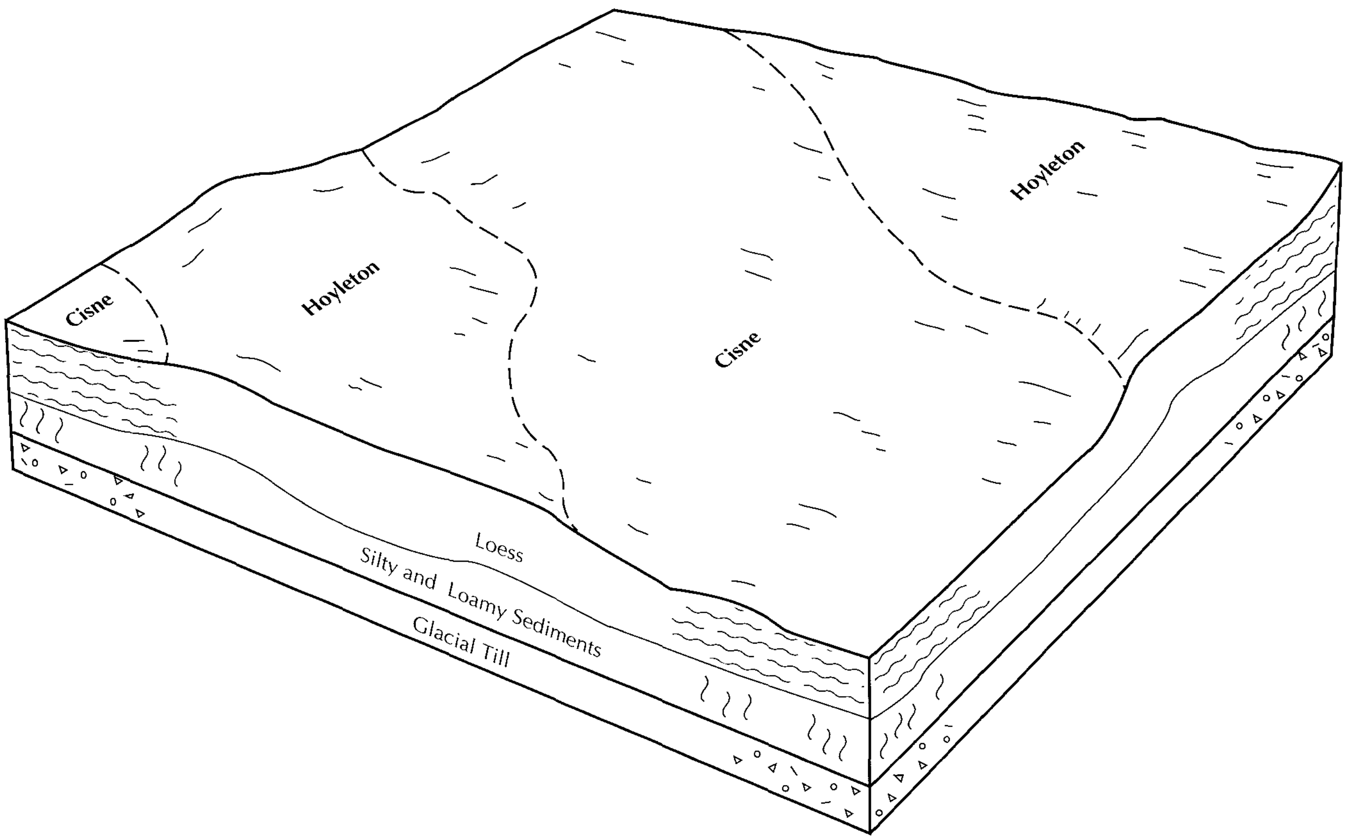

Figure 4.—Typical pattern of soils and parent material in the Cisne-Hoyleton association.

high water table, a high shrink-swell potential, and slow or very slow permeability are severe limitations affecting these uses.

4. Zanesville-Grantsburg-Frondorf Association

Gently sloping to steep, moderately well drained and well drained soils that formed in loess, silty sediments, and silty and loamy residuum; on uplands

This association consists mainly of soils on gently sloping, narrow ridges and sloping to steep side slopes. Slopes range from 2 to 30 percent.

This association makes up about 4 percent of the county. It is about 55 percent Zanesville soils, 14 percent Grantsburg soils, 14 percent Frondorf soils, and 17 percent soils of minor extent (fig. 5).

Zanesville soils are sloping and strongly sloping and are moderately well drained. They are moderately permeable in the upper part and slowly permeable in the lower part. They formed in loess and in the underlying silty sediments and loamy residuum weathered from sandstone, siltstone, and shale. They are on side slopes. The depth to bedrock ranges from 40 to 80 inches. Typically, the surface layer is mixed dark brown and yellowish brown, friable silt loam about 4 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is yellowish brown, firm silty clay loam. The next part is yellowish brown, mottled, firm, slightly brittle silty clay loam and silt loam. The lower part is yellowish brown, mottled, firm loam.

Grantsburg soils are gently sloping and are moderately well drained. They are moderately permeable in the upper part and very slowly permeable in the lower part. They formed in loess and in the underlying silty sediments. They are on ridges and knolls. The depth to bedrock ranges from 5 to 10 feet. Typically, the surface layer is dark brown, very friable silt loam about 8 inches thick. The subsurface layer is yellowish brown, friable silt loam about 4 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is yellowish brown, friable silty clay loam. The next part is yellowish brown, mottled, firm silty clay loam and friable silt loam. The lower part is yellowish brown, mottled, firm, slightly brittle silt loam.

Frondorf soils are moderately steep and steep, well drained, and moderately permeable. They formed in a

thin mantle of loess and in the underlying silty and loamy residuum weathered from sandstone, siltstone, and shale. They are on side slopes. The depth to bedrock ranges from 20 to 40 inches. Typically, the surface layer is dark brown, friable silt loam about 3 inches thick. The subsurface layer is yellowish brown, friable silt loam about 3 inches thick. The subsoil is about 22 inches thick. The upper part is yellowish brown, friable silt loam, and the lower part is yellowish brown, friable channery loam and channery silty clay loam. The underlying material to a depth of 60 inches or more is weathered sandstone and shale.

Of minor extent in this association are Ava, Banlic, and Belknap soils. The moderately well drained Ava soils formed in loess and in the underlying silty and loamy sediments. They are on ridges and side slopes. The somewhat poorly drained Banlic and Belknap soils formed in silty alluvium. They are on flood plains.

This association is used mainly for pasture, hayland, or woodland. Some areas are cultivated. The less sloping areas are suited to the cultivated crops commonly grown in the county. Erosion control is a management concern. The association is suited to pasture, hayland, and woodland. Controlling erosion and maintaining fertility and tilth are the main management concerns.

The less sloping areas of this association are poorly suited to dwellings and septic tank absorption fields because of slow or very slow permeability and the shrink-swell potential. The steeper areas are generally unsuited to these uses because of the slope and the shallow depth to bedrock.

5. Bonnie-Belknap Association

Nearly level, very poorly drained to somewhat poorly drained soils that formed in silty alluvium; on flood plains

This association consists of silty alluvial soils on flood plains. Slopes range from 0 to 2 percent.

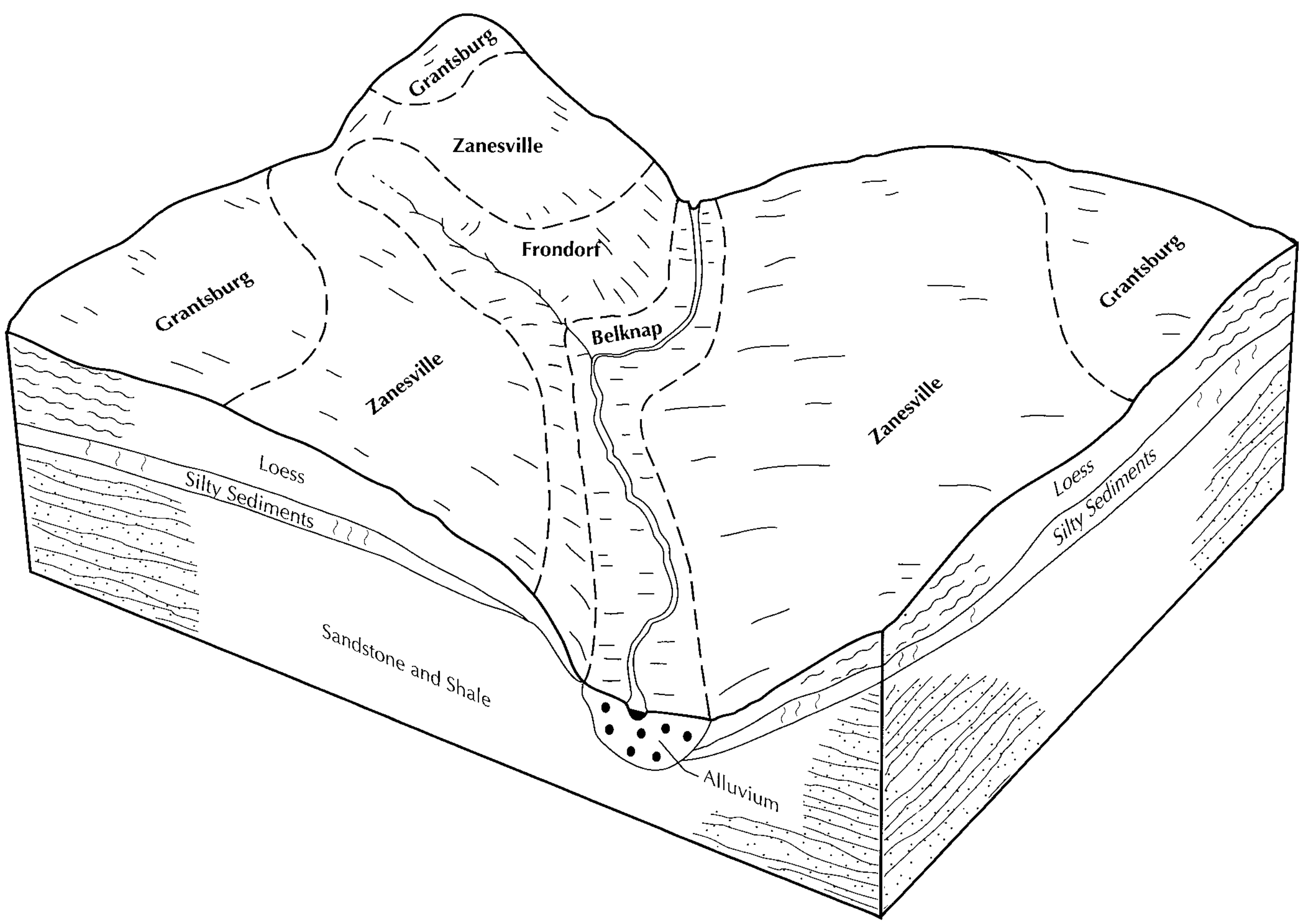

Figure 5.—Typical pattern of soils and parent material in the Zanesville-Grantsburg-Frondorf association.

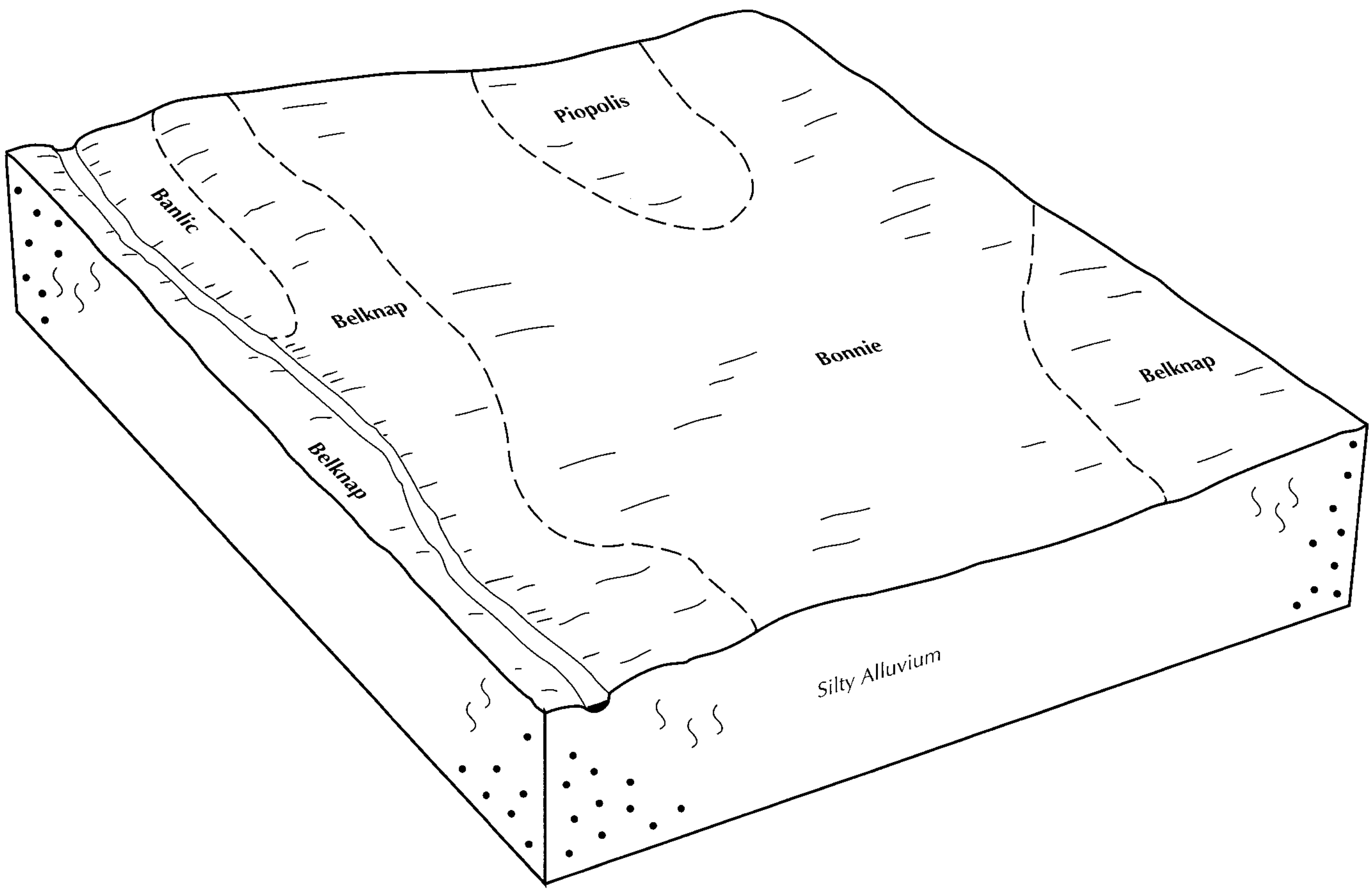

Figure 6.—Typical pattern of soils and parent material in the Bonnie-Belknap association.

This association makes up about 24 percent of the county. It is about 64 percent Bonnie soils, 20 percent Belknap soils, and 16 percent soils of minor extent (fig. 6).

Bonnie soils are poorly drained and very poorly drained and are moderately slowly permeable. Areas that are protected by levees are subject to rare flooding. Other areas are frequently flooded for brief or long periods from December through March. Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The underlying material to a depth of 60 inches or more is light gray and gray, mottled, and friable. The upper part is silt loam, and the lower part is silty clay loam.

Belknap soils are somewhat poorly drained and moderately slowly permeable. They are frequently flooded or occasionally flooded for brief periods from December through March. Typically, the surface layer is dark brown, friable silt loam about 10 inches thick. The subsurface layer is dark brown, mottled, friable silt loam about 8 inches thick. The underlying material to a depth of 60 inches or more is mottled, friable silt loam. The upper part is light brownish gray, and the lower part is grayish brown.

Of minor extent in this association are Banlic, Piopolis, and Sharon soils. The somewhat poorly drained Banlic soils have a dense, brittle layer in the subsoil. The poorly drained Piopolis soils have more clay in the surface layer and underlying material than the Bonnie and Belknap soils. The moderately well drained Sharon soils are on natural levees along the major streams and on narrow flood plains.

Most areas of this association are used for cultivated crops. The major soils are suited to the crops commonly grown in the county. Flooding and wetness are the major management concerns.

This association is generally unsuited to dwellings and septic tank absorption fields because of the flooding and wetness.

6. Zipp-Sexton-Patton Association

Nearly level, very poorly drained and poorly drained soils that formed in clayey, silty, and loamy lacustrine sediments or in loess and in the underlying loamy and silty lacustrine sediments; on terraces and lake plains

This association consists of soils on terraces and lake plains along major rivers and streams. Slopes are less than 2 percent.

This association makes up about 5 percent of the county. It is about 27 percent Zipp soils, 14 percent Sexton soils, 9 percent Patton soils, and 50 percent soils of minor extent (fig. 7).

Zipp soils are very poorly drained and are slowly permeable. They formed in clayey lacustrine sediments and are in broad, low areas on lake plains. They are frequently flooded for brief or long periods from December through March. Typically, the surface layer is dark grayish brown, mottled, firm silty clay about 8 inches thick. The subsoil extends to a depth of more than 60 inches. It is mottled, firm silty clay. The upper part is dark gray, and the lower part is gray.

Sexton soils are poorly drained and are slowly permeable. They formed in loess and in the underlying loamy and silty lacustrine sediments. They are on stream terraces. They are frequently flooded for brief periods from December through March. Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is light gray, mottled, friable silt loam about 5 inches thick. The subsoil extends to a depth of more than 60 inches. It is mottled. The upper part is light gray, firm silty clay loam. The next part is light brownish gray and light gray, firm silty clay loam and silty clay. The lower part is mixed light gray and yellowish brown, friable, stratified very fine sandy loam and loam.

Patton soils are poorly drained and formed in silty and loamy lacustrine sediments. They are moderately permeable in the upper part and moderately slowly permeable in the lower part. They are on low stream terraces and lake plains. They are frequently flooded for brief periods from December through March. Typically,

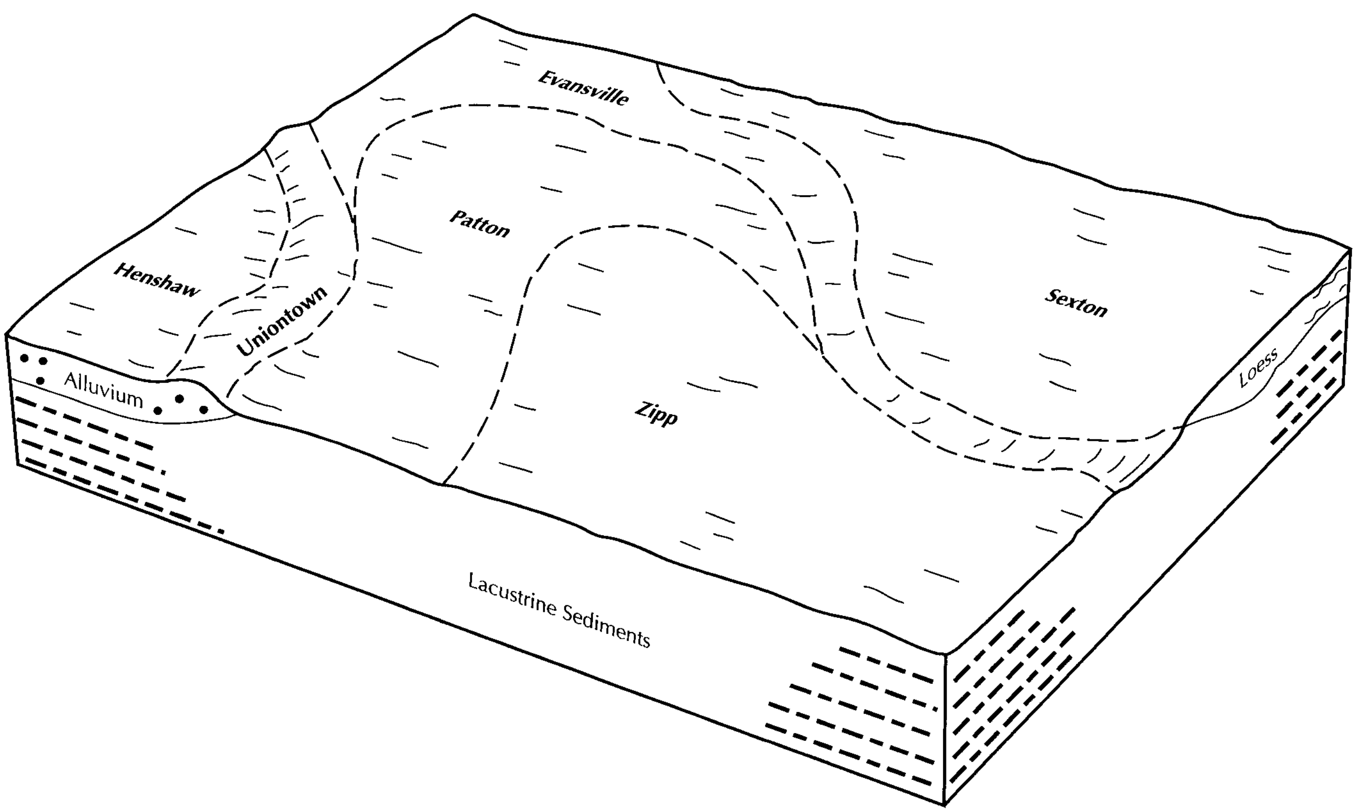

Figure 7.—Typical pattern of soils and parent material in the Zipp-Sexton-Patton association.

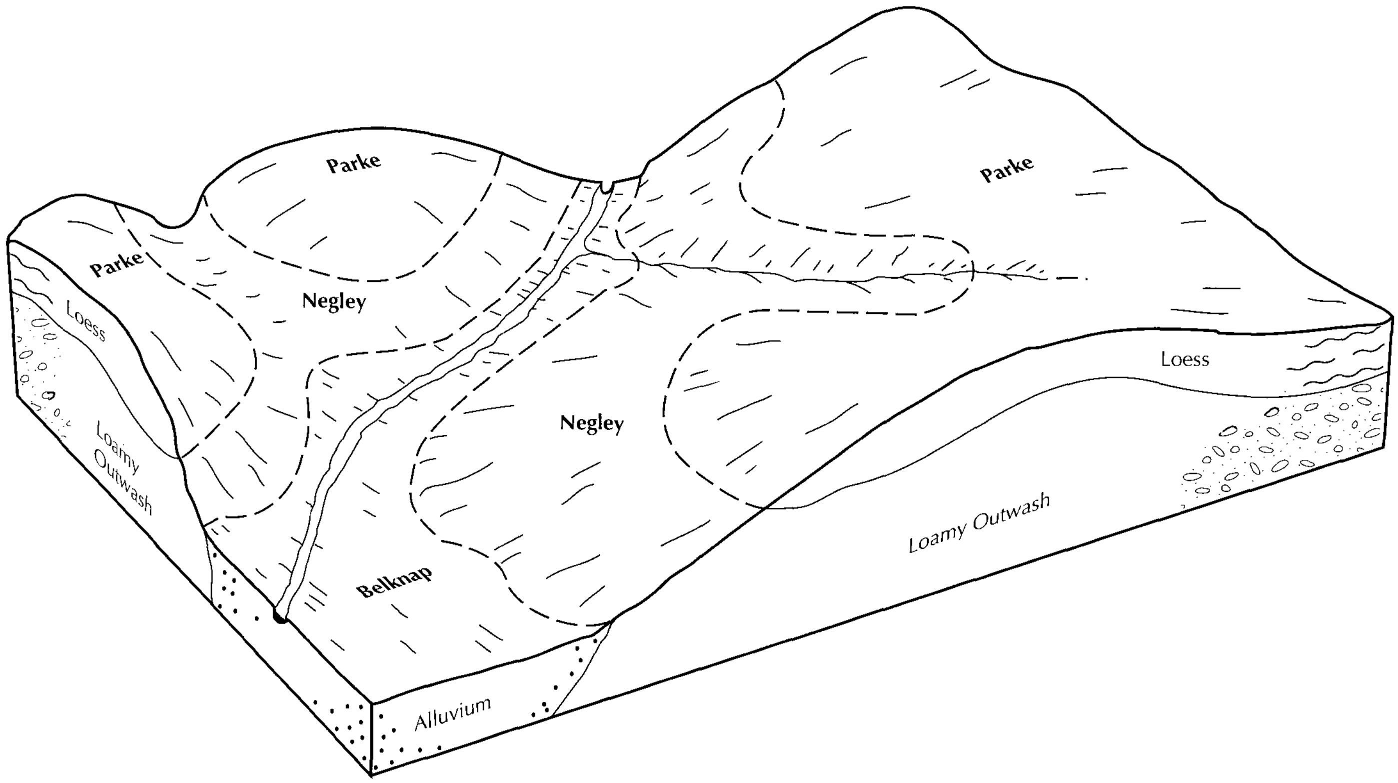

Figure 8.—Typical pattern of soils and parent material in the Parke-Negley association.

the surface layer is very dark brown, friable silty clay loam about 11 inches thick. The subsoil is about 39 inches thick. It is mottled and firm. The upper part is dark gray and olive gray silty clay loam. The next part is light gray, olive, and yellowish brown silty clay loam. The lower part is light gray, stratified silt loam and loam. The underlying material to a depth of 60 inches or more is light gray, mottled, firm, stratified silt loam and loam.

Of minor extent in this association are Evansville, Henshaw, and Uniontown soils. The poorly drained Evansville soils have a light-colored surface layer. They are in landscape positions similar to those of the major soils. Henshaw soils are somewhat poorly drained and are in the higher positions above the major soils on stream terraces. Uniontown soils are moderately well drained and are on side slopes on low stream terraces.

Most areas of this association are used for corn or soybeans. Improving surface drainage, providing protection from flooding, and improving soil tilth are the main management concerns.

This association is unsuited to building site development because of flooding.

7. Parke-Negley Association

Gently sloping to steep, well drained soils that formed in loess and in the underlying loamy outwash or that formed entirely in loamy outwash; on outwash plains

This association consists of gently sloping soils on ridges and sloping to steep soils on side slopes. Slopes range from 2 to 45 percent.

This association makes up only about 1 percent of the county. Because of the nature of the soil material, however, the association requires unique management practices. It is about 60 percent Parke soils, 25 percent Negley soils, and 15 percent soils of minor extent (fig. 8).

Parke soils are gently sloping and sloping and are moderately permeable. They are on narrow ridges and side slopes. They formed in loess and in the underlying loamy outwash. Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is yellowish brown, friable silt loam. The next part is strong brown, firm silty clay loam. The lower part is strong brown and yellowish red, friable loam.

Negley soils are strongly sloping to steep and are

moderately rapidly permeable. They are on side slopes. They formed in loamy outwash. Typically, the surface layer is very dark grayish brown, friable loam about 2 inches thick. The subsurface layer is brown, friable loam about 6 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is brown and strong brown, friable loam. The lower part is strong brown, friable sandy loam and gravelly sandy loam.

Of minor extent in this association are Ava, Belknap, Frondorf, and Zanesville soils. The moderately well drained Ava soils formed in loess and in the underlying silty and loamy sediments. They have a fragipan. They are on ridges and side slopes. Frondorf soils formed in loess and in the underlying residuum. They are on side slopes. They are underlain by bedrock at a depth of 20 to 40 inches. The moderately well drained Zanesville soils formed in loess and in the underlying silty sediments and loamy residuum. They are on side slopes. They are underlain by bedrock at a depth of 40 to 80 inches. They have a fragipan.

Most areas of this association are used for trees, hay, pasture, or grain crops. Parke soils are well suited to crop production, hay, and pasture and to use as sites for dwellings and septic tank absorption fields. The steep areas of Negley soils are suited to hay, pasture, and woodland.

Erosion control is the major management need in areas used for crop production, hay, or pasture. The construction of ponds is difficult in areas of this association because of the sandy or gravelly underlying material. Sloping areas of Negley soils are moderately suited to homesite development, but steep areas are unsuited to homesite development and onsite sewage disposal because of the slope.

Broad Land Use Considerations

The soils in Wayne County vary widely in their suitability for major land uses. Most of the land in the county is used for cultivated crops, dominantly corn and soybeans. This cropland is in scattered areas throughout the county. In cultivated areas of associations 1, 2, 4, and 7, which are in the uplands, erosion is the main hazard. Wetness is a major concern in cultivated areas of associations 1, 3, 5, and 6. The soils in associations 5 and 6 are frequently flooded, mainly in winter and early spring. Soils in associations 3 and 6 have the highest natural fertility. Many areas in associations 4 and 7 are unsuited to row crops because of the erosion hazard.

Several thousand acres in the Wayne County area are used for pasture or woodland. Much of this acreage is in association 4. Recently, large areas of woodland in associations 5 and 6 have been cleared and have been converted to cropland.

Only small acreages of woodland are managed for timber production. Areas of newly planted trees have good potential for wildlife habitat.

The suitability for recreational uses varies, depending upon the type and intensity of the expected use. Associations 2, 4, and 7 are the most scenic, but wetness and the hazard of erosion limit recreational development. Ponding, flooding, and wetness limit the development of associations 5 and 6 for recreational uses. Soils best suited to recreational uses are in association 2, but slow or very slow permeability, wetness, and erosion are management concerns. Also, the soils in this association are well suited to other land uses and thus are unlikely to be used as recreational areas.

The suitability for the development of habitat for selected types of wildlife is good throughout the county. Associations 2, 4, and 7 are well suited to woodland wildlife habitat, associations 1 and 3 are well suited to openland wildlife habitat, and associations 5 and 6 are well suited to wetland wildlife habitat.

Various limitations affect the use of the soils in the county for building site development or onsite waste disposal. The soils in associations 1 and 3 are limited as sites for sanitary facilities and buildings because of wetness. Slow or very slow permeability also is a limitation on sites for septic tank absorption fields. Low strength and the potential for frost action are limitations on sites for local roads and streets. The soils in these associations are suitable as sites for sewage lagoons. Installing tile drains around footings and backfilling with gravel or sand help to overcome some of the limitations on sites for dwellings. The soils are drained mostly by shallow surface ditches.

Many areas in associations 2, 4, and 7 are too steep to be used as construction sites. Also, excavation is difficult in many areas because of a limited depth to bedrock. The soils in associations 5 and 6 are unsuitable as sites for sanitary facilities and buildings because of flooding and wetness.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Bluford silt loam, 2 to 5 percent slopes, is a phase of the Bluford series.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

2—Cisne silt loam. This nearly level, poorly drained soil is on broad till plains in the uplands. Individual areas are irregular in shape and range from 5 to more than 100 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 9 inches thick. The subsurface layer is light brownish gray and light gray, mottled, friable silt loam about 11 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is light brownish gray, firm silty clay, and the lower part is light brownish gray, firm silty clay loam. In some areas the surface layer is lighter in color. In other areas the subsoil contains less clay and more silt.

Included with this soil in mapping are small areas of the somewhat poorly drained Bluford soils. These soils have brittle layers in the lower part of the subsoil. They are on ridges above the Cisne soil. Also included are some areas of the somewhat poorly drained Hoyleton soils on ridges above the Cisne soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Cisne soil at a very slow rate. Surface runoff is slow. The seasonal high water table is perched within a depth of 2 feet from December through May in most years. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is poorly suited to dwellings and to septic tank absorption fields.

This soil is sufficiently drained for corn, soybeans, and small grain. Additional drainage is needed in some areas. Measures that maintain the drainage system are needed. A combination of surface ditches and land leveling can reduce wetness. Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration. Soil that is bare of vegetation tends to puddle after intense rainfall and to form a crust as it

dries. Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the infiltration rate and help to maintain good tilth. Winter wheat and hay crops are subject to frost heave in some years.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table. Elevating the floor of dwellings above the surrounding ground level, grading, and diverting surface water from the site also help to overcome the wetness.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function properly because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIIw.

3A—Hoyleton silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on ridges in the uplands. Individual areas are irregular in shape and range from 2 to about 100 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is brown, friable silt loam. The next part is light yellowish brown and brown, firm silty clay loam. The lower part is yellowish brown and pale brown, friable and firm silt loam and loam. In some areas the surface layer is lighter in color. In other areas the subsoil contains less clay.

Included with this soil in mapping are small areas of the poorly drained Cisne soils in the lower positions below the Hoyleton soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Hoyleton soil at a slow rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet from January through April in most years. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to corn, soybeans, and small grain. It is poorly suited to dwellings and to septic tank absorption fields.

In areas used for corn, soybeans, or small grain, the seasonal high water table delays planting in some years. Surface ditches and land leveling help to remove excess water. Erosion can be a hazard in the more sloping areas. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function properly because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIw.

3B—Hoyleton silt loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on knolls and ridges in the uplands. Individual areas are generally rounded or elongated and range from 3 to about 80 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 8 inches thick. The subsurface layer is about 13 inches thick. The upper part is brown, friable silt loam. The lower part is pale brown, friable silt loam and strong brown, friable silty clay loam. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is yellowish brown, firm silty clay loam, and the lower part is yellowish brown, firm loam. In places the surface layer is dark grayish brown. Some small areas are nearly level. In some areas the surface layer is thinner and contains more clay.

Included with this soil in mapping are areas of eroded Hoyleton soils. These soils are on the slightly steeper or longer slopes. They have a surface layer that contains subsoil material and that is lighter in color than that of the uneroded Hoyleton soil. They make up 2 to 5 percent of the unit.

Water and air move through the Hoyleton soil at a slow rate. Surface runoff is medium. The seasonal high water table is at a depth of 1 to 3 feet from January through April in most years. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to corn, soybeans, and small grain. It is poorly suited to dwellings and to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard unless the surface is protected. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces. Also, seasonal wetness delays planting in some years. The

wetness can be reduced by surface ditches. Tilling when the soil is wet causes surface compaction and cloddiness and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function properly because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIe.

5C2—Blair silt loam, 5 to 10 percent slopes, eroded. This sloping, somewhat poorly drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 3 to more than 100 acres in size.

Typically, the surface layer is mixed dark yellowish brown and yellowish brown, friable silt loam about 8 inches thick. It has been thinned by erosion. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is yellowish brown, friable silt loam. The lower part is yellowish brown and light brownish gray, firm loam. In some severely eroded areas, the surface layer is thinner and has a higher content of clay. In places the subsoil contains more clay.

Included with this soil in mapping are small areas of Atlas and Bluford soils. Atlas soils formed in glacial till or accretion gley. They have more clay in the subsoil than the Blair soil. They are on slopes below the Blair soil. Bluford soils formed in loess and in the underlying silty sediments. They are on gently sloping side slopes. Also included are areas of soils that have a high content of sodium in the lower part of the subsoil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Blair soil at a moderately slow rate. Surface runoff is medium. The seasonal high water table is at a depth of 1.5 to 3.5 feet from January through April in most years. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops, pasture, or hay. This soil is suited to cultivated crops, hay, and pasture and to dwellings. It is poorly suited to use as a site for septic tank absorption fields.

Measures that control erosion are needed in the areas used for corn, soybeans, or small grain. Suitable practices include contour farming, terraces, a crop rotation that includes 1 or more years of grasses and legumes, and a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain tilth.

Adapted forage crops grow well on this soil if properly managed. Overgrazing or grazing when the soil is wet reduces yields and increases the runoff rate and the hazard of erosion. Establishing new stands can be difficult because well prepared seedbeds tend to erode easily. They also tend to puddle and crust after intense rainfall. Applications of fertilizer should be based on the results of soil tests, and seed should be applied at recommended rates. Leaving crop residue on the surface and planting nurse crops help to control erosion until the seedlings are established. New stands should not be grazed or clipped until they are well established. Proper stocking rates, rotation grazing, and proper fertilization help to keep the pasture in good condition.

The seasonal high water table, the shrink-swell potential, and the slope are limitations if this soil is used as a site for dwellings. The seasonal high water table can be lowered by installing tile drains around the base of foundations. Reinforcing foundations and widening and backfilling the foundation trench with suitable material help to prevent the structural damage caused by shrinking and swelling. Land shaping by cutting and filling helps to overcome the slope. The hazard of erosion can be reduced during construction by leaving as much vegetation on the surface as possible. Disturbed areas should be seeded and mulched or sodded.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function well because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIIe.

5C3—Blair silt loam, 5 to 10 percent slopes, severely eroded. This sloping, somewhat poorly drained soil is on side slopes in the uplands. In most areas, the original surface layer has been removed by erosion and tillage has mixed the remaining surface layer with the upper part of the subsoil. Individual areas of this soil are irregular in shape and range from 3 to more than 80 acres in size.

Typically, the surface layer is mixed dark brown and

yellowish brown, friable silt loam about 6 inches thick. The subsoil extends to a depth of 60 inches or more. It is clay loam. The upper part is yellowish brown, mottled, and friable and firm. The next part is light brownish gray, mottled, and firm. The lower part is light gray and yellowish brown, mottled, and firm. In places the subsoil contains more clay.

Included with this soil in mapping are small areas of Atlas soils. These soils formed in glacial till or accretion gley. They have more clay in the subsoil than the Blair soil. They are on slopes below the Blair soil. Also included are soils that have a high sodium content in the lower part of the subsoil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Blair soil at a moderately slow rate. Surface runoff is rapid. The seasonal high water table is at a depth of 1.5 to 3.5 feet from January through April in most years. Available water capacity is high. Organic matter content is low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops, pasture, or hay. This soil is poorly suited to cultivated crops and is moderately suited to pasture and hay. It is poorly suited to use as a site for dwellings with basements or for septic tank absorption fields and is moderately suited to use as a site for dwellings without basements.

Further erosion is a hazard in the areas used for corn, soybeans, or small grain. It can be controlled by contour farming, terraces, a system of conservation tillage that leaves crop residue on the surface after planting, or a crop rotation that is dominated by forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

Adapted forage crops grow well on this soil if properly managed. Overgrazing or grazing when the soil is wet reduces yields and increases the runoff rate and the hazard of erosion. Establishing new stands can be difficult because well prepared seedbeds tend to erode easily unless some crop residue is left on the surface. The soil also tends to puddle and crust after intense rainfall. Applications of fertilizer should be based on the results of soil tests, and seed should be applied at recommended rates. Leaving crop residue on the surface and planting nurse crops help to control erosion until the seedlings are established. New stands should not be grazed or clipped until they are well established.

The seasonal high water table, the shrink-swell potential, and the slope are limitations if this soil is used as a site for dwellings. The seasonal high water table can be lowered by installing tile drains around the base of foundations. Reinforcing foundations and widening and backfilling the foundation trench with suitable material help to prevent the structural damage caused by shrinking and swelling. Land shaping helps to overcome the slope. The hazard of erosion can be reduced during construction by leaving as much vegetation on the surface as possible. Disturbed areas should be seeded or sodded.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function well because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IVe.

7C3—Atlas silty clay loam, 5 to 10 percent slopes, severely eroded. This sloping, somewhat poorly drained soil is on side slopes in the uplands. In most areas, the original surface layer has been removed by erosion and tillage has mixed the remaining surface layer with the upper part of the subsoil. Individual areas of this soil are irregular in shape and range from 3 to about 40 acres in size.

Typically, the surface layer is mixed brown and yellowish brown, firm silty clay loam about 3 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled, firm clay loam. The upper part is light brownish gray, and the lower part is light gray and yellowish brown. In some areas, the soil has a thin mantle of loess and the surface layer is silt loam. In other areas the subsoil contains less clay.

Included with this soil in mapping are small areas of Ava, Blair, and Hickory soils. The moderately well drained Ava soils formed in loess and in the underlying silty and loamy sediments. They are on ridges and the upper part of side slopes above the Atlas soil. Blair soils formed in silty and loamy sediments and in the underlying glacial till. They have less clay in the subsoil than the Atlas soil. They are on the upper part of side slopes. The moderately well drained Hickory soils are on the steeper side slopes below the Atlas soil. Also included are small areas of alluvial soils on flood plains. Included soils make up 10 to 15 percent of the unit.

Water and air move through the Atlas soil at a very slow rate. Surface runoff is rapid. The seasonal high water table is perched at a depth of 1 to 2 feet from April through June in most years. Available water capacity is moderate. Organic matter content is low. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops, hay, or pasture. This soil is poorly suited to cultivated crops and to use as a site for dwellings or for septic tank

absorption fields. It is moderately suited to pasture and hay.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. Poor tilth, wetness, and the moderate available water capacity are limitations. A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion. Adding organic material and returning crop residue to the soil can minimize crusting and surface compaction, improve tilth, and increase the rate of water infiltration.

Adapted forage crops grow well on this soil if properly managed. Overgrazing or grazing when the soil is wet reduces yields and increases the runoff rate and the hazard of erosion. Establishing new stands can be difficult because of poor tilth. Applications of fertilizer should be based on the results of soil tests, and seed should be applied at recommended rates. Leaving crop residue on the surface and planting nurse crops help to control erosion and minimize crusting until the seedlings are established. New stands should not be grazed or clipped until they are well established. Proper stocking rates, rotation grazing, and proper fertilization help to keep the pasture in good condition.

The shrink-swell potential, the seasonal high water table, and the slope are limitations if this soil is used as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Underground drains help to control the water table. Land shaping helps to overcome the slope.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function well because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IVe.

8D2—Hickory silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, moderately well drained soil is on side slopes in the uplands. Individual areas are long and narrow and range from 4 to about 80 acres in size.

Typically, the surface layer is mixed dark yellowish brown and yellowish brown, friable silt loam about 8 inches thick. It has been thinned by erosion. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown, friable loam and firm clay loam. The lower part is yellowish brown, mottled, firm clay loam. In some uneroded areas the surface layer is darker. In some places the slope is more than 15 percent, and in other places the surface layer is loam. In some areas bedrock is at a depth of less than 60 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas soils. These soils have more clay in the subsoil than the Hickory soil. Also included are areas of the somewhat poorly drained Blair soils on side slopes above the Hickory soil. Included soils make up 10 to 15 percent of the unit.

Water and air move through the Hickory soil at a moderate rate. Surface runoff is rapid. The seasonal high water table is at a depth of 4 to 6 feet from January through April in most years. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for pasture or woodland. A few areas are cultivated. This soil is moderately suited to cultivated crops, pasture, and hay and to use as a site for dwellings or for septic tank absorption fields. It is well suited to woodland.

Measures that control erosion are needed in the areas used for corn, soybeans, or small grain. Suitable practices include contour farming, terraces, a system of conservation tillage that leaves crop residue on the surface after planting, or a crop rotation that includes 1 or more years of grasses and legumes. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material improve tilth and increase the rate of water infiltration.

Adapted forage crops grow well on this soil if properly managed. Overgrazing or grazing when the soil is wet reduces yields and increases the runoff rate and the hazard of erosion. Establishing new stands can be difficult because of poor tilth. Applications of fertilizer should be based on the results of soil tests, and seed should be applied at recommended rates. Leaving crop residue on the surface and planting nurse crops help to control erosion and minimize crusting until the seedlings are established. New stands should not be grazed or clipped until they are well established. Proper stocking rates, rotation grazing, and proper fertilization help to keep the pasture in good condition.

In areas used as woodland, protection from fire and from grazing by livestock is essential. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

The seasonal high water table, the shrink-swell potential, and the slope are limitations if this soil is used as a site for dwellings. The seasonal high water table can be lowered by installing tile drains around the base of foundations. Reinforcing foundations and widening and backfilling the foundation trench with suitable material help to prevent the structural damage caused

by shrinking and swelling. Land shaping helps to overcome the slope. The hazard of erosion can be reduced during construction by leaving as much vegetation on the surface as possible. Disturbed areas should be seeded and mulched or sodded.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function well because of the slope and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIIe.

8D3—Hickory silt loam, 10 to 15 percent slopes, severely eroded. This strongly sloping, moderately well drained soil is on side slopes in the uplands. In most areas, the original surface layer has been removed by erosion and tillage has mixed the remaining surface layer with the upper part of the subsoil. Individual areas of this soil are long and narrow and range from 4 to 80 acres in size.

Typically, the surface layer is yellowish brown, friable silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown, firm loam and clay loam. The lower part is yellowish brown, mottled, firm clay loam. In some areas gray mottles are in the upper part of the subsoil. In other areas the surface layer is loam or clay loam. In places bedrock is within a depth of 60 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas soils. These soils have more clay in the subsoil than the Hickory soil. Also included are areas of the somewhat poorly drained Blair soils on side slopes above the Hickory soil. Included soils make up 10 to 15 percent of the unit.

Water and air move through the Hickory soil at a moderate rate. Surface runoff is rapid. The seasonal high water table is at a depth of 4 to 6 feet from January through April in most years. Available water capacity is moderate. Organic matter content is low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops, hay, or pasture. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay and to use as a site for dwellings.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. Poor tilth is a limitation. A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion. Adding organic material and returning crop residue to the soil can minimize crusting and surface compaction, improve tilth, and increase the rate of water infiltration.

Adapted forage crops grow well on this soil if properly managed. Overgrazing or grazing when the soil is wet reduces yields and increases the runoff rate and the hazard of erosion. Establishing new stands can be difficult because of poor tilth. Applications of fertilizer should be based on the results of soil tests, and seed should be applied at recommended rates. Leaving crop residue on the surface and planting nurse crops help to control erosion and minimize crusting until the seedlings are established. New stands should not be grazed or clipped until they are well established. Proper stocking rates, rotation grazing, and proper fertilization help to keep the pasture in good condition.

The seasonal high water table, the shrink-swell potential, and the slope are limitations if this soil is used as a site for dwellings. The seasonal high water table can be lowered by installing tile drains around the base of foundations. Reinforcing foundations and widening and backfilling the foundation trench with suitable material help to prevent the structural damage caused by shrinking and swelling. Land shaping helps to overcome the slope. The hazard of erosion can be reduced during construction by leaving as much vegetation on the surface as possible. Disturbed areas should be seeded or sodded.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function well because of the slope and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IVe.

8E—Hickory loam, 15 to 20 percent slopes. This moderately steep, moderately well drained soil is on side slopes in the uplands. Individual areas are long and narrow or irregular in shape and range from 5 to more than 20 acres in size.

Typically, the surface layer is dark brown, friable loam about 5 inches thick. The subsurface layer is strong brown, friable loam about 4 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is strong brown, friable loam and firm clay loam. The lower part is yellowish brown, mottled, firm loam. In places the surface layer is silt loam. Some areas are eroded, have a thinner surface layer, and contain more clay in the surface layer and subsurface layer. In other areas bedrock is within a depth of 60 inches.

Included with this soil in mapping are areas of soils in which the subsoil formed in a paleosol. These soils contain more clay in the subsoil than the Hickory soil. They are in landscape positions similar to those of the Hickory soil. Also included are small areas of alluvial soils on flood plains along drainageways. Included soils make up 10 to 15 percent of the unit.

Water and air move through the Hickory soil at a

Figure 9.—Woodland in an area of Hickory loam, 15 to 20 percent slopes.

moderate rate. Surface runoff is rapid. The seasonal high water table is at a depth of 4 to 6 feet from January through April in most years. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for pasture or woodland. This soil is well suited to woodland (fig. 9). It is moderately suited to pasture. It is poorly suited to cultivated crops and to use as a site for dwellings. It is unsuited to use as a site for septic tank absorption fields.

Unless the surface is protected, erosion is a severe hazard in the areas used for corn, soybeans, or small grain. It can be controlled by contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, and a cropping sequence that is dominated by forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

Adapted forage plants grow well on this soil. A permanent cover of pasture plants helps to control erosion and maintains tilth. Erosion control is needed

when grasses and legumes are established. In areas where the pasture is already established, seeding legumes on the contour with a no-till planter and applying the needed fertilizer improve forage quality. In areas where new stands are being established, applications of fertilizer should be based on the results of soil tests and the existing plant cover should be disturbed as little as possible. In some areas mulching may be required. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

In areas used as woodland, protection from fire and from grazing by livestock is essential. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

This soil is poorly suited to use as a site for dwellings because of the slope. Land shaping and special design help to overcome this limitation. In cut and filled areas, mulching and seeding as soon as possible help to control erosion.

This soil is unsuited to use as a site for onsite waste disposal because of the slope.

The land capability classification is IVe.

8E3—Hickory clay loam, 15 to 20 percent slopes, severely eroded. This moderately steep, moderately well drained soil is on side slopes in the uplands. In most areas, the original surface layer has been removed by erosion and tillage has mixed the remaining surface layer with the upper part of the subsoil. Individual areas of this soil are long and narrow or irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is brown, firm clay loam about 4 inches thick. The subsoil extends to a depth of 60 inches or more. It is yellowish brown, firm clay loam. It is mottled in the lower part. In some areas bedrock is within a depth of 60 inches.

Included with this soil in mapping are areas of soils in which the subsoil formed in a paleosol. These soils contain more clay in the subsoil than the Hickory soil. They are in landscape positions similar to those of the Hickory soil. Also included are small areas of alluvial soils on flood plains along drainageways. Included soils make up 10 to 15 percent of the unit.

Water and air move through the Hickory soil at a moderate rate. Surface runoff is rapid. The seasonal high water table is at a depth of 4 to 6 feet from January through April in most years. Available water capacity is moderate. Organic matter content is low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for pasture or cultivated crops. This soil is moderately suited to pasture. It generally is unsuited to cultivated crops because of a severe hazard of erosion. It is poorly suited to use as a site for dwellings and is unsuited to use as a site for septic tank absorption fields.

Adapted forage crops grow well on this soil if properly managed. Overgrazing or grazing when the soil is wet reduces yields and increases the runoff rate and the hazard of erosion. Establishing new stands can be difficult because of poor tilth. Applications of fertilizer should be based on the results of soil tests, and seed should be applied at recommended rates. Leaving crop residue on the surface and planting nurse crops help to control erosion and minimize crusting until the seedlings are established. New stands should not be grazed or clipped until they are well established. Proper stocking rates, rotation grazing, and proper fertilization help to keep the pasture in good condition.

In areas used as woodland, protection from fire and from grazing by livestock is essential. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

If this soil is used as a site for dwellings, the slope is a major limitation. Land shaping and special design can help to overcome this limitation. In cut and filled areas, mulching and seeding as soon as possible help to control erosion.

This soil is unsuited to use as a site for onsite waste disposal because of the slope.

The land capability classification is VIe.

8F—Hickory loam, 20 to 30 percent slopes. This steep, well drained soil is on side slopes in the uplands. Individual areas are long and narrow and range from 5 to about 50 acres in size.

Typically, the surface layer is dark brown, friable loam about 6 inches thick. The subsurface layer is yellowish brown, friable loam about 4 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown, friable and firm silty clay loam. The lower part is yellowish brown, mottled, firm clay loam. In some areas bedrock is within a depth of 60 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Belknap and moderately well drained Sharon soils on flood plains. Also included are small areas of the moderately well drained Ava soils on ridges and side slopes above the Hickory soil and the somewhat poorly drained Atlas soils on side slopes above the Hickory soil. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Hickory soil at a moderate rate. Surface runoff is rapid. Available water

capacity is moderate. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for pasture or woodland. This soil is well suited to woodland. It is moderately suited to pasture. It is unsuited to cultivated crops and to use as a site for dwellings or for septic tank absorption fields because of the slope.

Adapted forage plants grow well on this soil. A permanent cover of pasture plants helps to control erosion and maintains tilth. Erosion control is needed when grasses and legumes are established. In areas where the pasture is already established, seeding legumes on the contour with a no-till drill and applying the needed fertilizer improve forage quality. In areas where new stands are being established, applications of fertilizer should be based on the results of soil tests and the existing plant cover should be disturbed as little as possible. In some areas mulching may be required. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as woodland, protection from fire and from grazing by livestock is essential. Logging roads and skid trails should be established on the contour as much as possible. Water bars are needed to divert surface water from logging roads and skid trails. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. The use of machinery should be limited to periods when the soil is firm enough to support the equipment. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. If trees are planted mechanically, they should be planted on the contour and a cover of grass should be established between the rows.

The land capability classification is VIe.

12—Wynoose silt loam. This nearly level, poorly drained soil is on broad till plains in the uplands. Individual areas are irregular in shape and range from 3 to 500 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is light brownish gray, mottled, friable silt loam about 13 inches thick. The subsoil extends to a depth of 60 inches or more. It is light brownish gray, mottled, and firm. The upper part is silty clay, and the lower part is silty clay loam. In some areas the surface layer is darker. In other areas the subsoil is at a depth of more than 24 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Bluford and Hoyleton soils on ridges above the Wynoose soil. These soils make up 5 to 10 percent of the unit.

Water and air move through the Wynoose soil at a very slow rate. Surface runoff is slow. The seasonal high water table is perched within a depth of 2 feet from December through May in most years. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

In areas where the soil is sufficiently drained, corn, soybeans, and small grain can be grown. Additional drainage is needed in some areas. Measures that maintain the drainage system are needed. A combination of surface ditches and land leveling can reduce the wetness. Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration. Soil that is bare of vegetation tends to puddle after intense rainfall and to form a crust as it dries. Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the rate of water infiltration and help to maintain good tilth. Winter wheat and hay crops are subject to frost heave in some years.

If this soil is used for hay and pasture, wetness limits the choice of plants and the period of grazing or cutting. Shallow ditches and land smoothing can reduce the wetness. Applications of fertilizer, weed control, rotation grazing, proper stocking rates, and timely harvesting help to keep the pasture or hayland in good condition.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table. Elevating the floor of dwellings above the surrounding ground level, grading, and diverting surface water from the site also help to overcome the wetness.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function properly because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIIw.

13A—Bluford silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on broad ridges in the uplands. Individual areas are oval or

irregular in shape and range from 3 to more than 250 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is pale brown, mottled, friable silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. It is light brownish gray, mottled silty clay loam. The upper part is firm, and the lower part is firm and brittle. In some areas, the subsurface layer is thicker and the subsoil contains less clay. In other areas, the subsurface layer is not mottled and the upper part of the subsoil is browner.

Included with this soil in mapping are small areas of the poorly drained Wynoose soils in the lower positions on the landscape. These soils make up about 10 percent of the unit.

Water and air move through the Bluford soil at a slow rate. Surface runoff is slow. The seasonal high water table is perched at a depth of 1 to 3 feet from January through April in most years. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

In areas used for corn, soybeans, or small grain, the seasonal wetness delays planting in some years. Surface ditches and land leveling help to remove excess water. Erosion can be a hazard in some of the more sloping areas. It can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface cloddiness and compaction and increases the runoff rate and the hazard of erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Adapted forage and hay plants grow well on this soil. Overgrazing or grazing when the soil is too wet reduces forage yields and causes surface compaction. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function well because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIw.

13B—Bluford silt loam, 2 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on broad ridges and side slopes in the uplands. Individual areas are irregular in shape and range from 5 to more than 200 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown, mottled, friable silt loam. The next part is light brownish gray, mottled, firm silty clay loam. The lower part is mottled light brownish gray and yellowish brown, firm and slightly brittle silty clay loam and silt loam. In eroded areas the surface layer has a higher content of clay. In some places, the subsurface layer is thicker and the subsoil contains less clay.

Included with this soil in mapping are small areas of the poorly drained Wynoose soils in the lower positions on the landscape. Also included are areas of eroded Bluford soils and small areas of the moderately well drained Ava soils. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Bluford soil at a slow rate. Surface runoff is medium. The seasonal high water table is perched at a depth of 1 to 3 feet from January through April in most years. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. This soil is well suited to cultivated crops, pasture, and hay. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard unless the surface is protected. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces. Also, seasonal wetness delays planting in some years. Wetness can be reduced by surface ditches. Tilling when the soil is wet causes surface compaction and cloddiness and increases the runoff rate and the hazard of erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

Adapted forage and hay plants grow well on this soil. Overgrazing or grazing when the soil is too wet reduces forage yields and causes surface compaction. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good

condition and help to control erosion.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function well because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIe.

13B2—Bluford silt loam, 2 to 5 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 3 to 50 acres in size.

Typically, the surface layer is mixed dark brown and yellowish brown, friable silt loam about 7 inches thick. It has been thinned by erosion. The subsoil extends to a depth of 60 inches or more. It is mottled silty clay loam. The upper part is yellowish brown and light brownish gray and is friable and firm. The lower part is light brownish gray and is firm and slightly brittle. In some areas the subsoil contains less clay.

Included with this soil in mapping are small areas of the moderately well drained Ava soils on ridges above the Bluford soil. Also included are areas of alluvial soils on small, narrow flood plains below the Bluford soil. Included soils make up about 10 percent of the unit.

Water and air move through the Bluford soil at a slow rate. Surface runoff is medium. The seasonal high water table is perched at a depth of 1 to 3 feet from January through April in most years. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. This soil is well suited to cultivated crops, pasture, and hay. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

Measures that prevent further erosion are needed in the areas used for corn, soybeans, or small grain. Suitable practices include contour farming, terraces, and a system of conservation tillage that leaves crop residue on the surface after planting. Wetness delays planting in some years, and some areas may be seepy. Surface ditches and grassed waterways can reduce the wetness. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Adapted forage and hay plants grow well on this soil. Overgrazing or grazing when the soil is too wet reduces forage yields and causes surface compaction. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function well because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIe.

14B—Ava silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridges in the uplands. Individual areas are long and narrow and range from 3 to 100 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 8 inches thick. The subsurface layer is yellowish brown, friable silt loam about 5 inches thick. The subsoil to a depth of 60 inches or more is silty clay loam. The upper part is yellowish brown and dark yellowish brown and is firm. The next part is dark yellowish brown and yellowish brown, mottled, and firm and slightly brittle. The lower part is yellowish brown, mottled, and firm. In some areas the subsoil has redder colors and is not brittle. In other areas the upper part of the subsoil has gray mottles.

Included with this soil in mapping are small areas of the somewhat poorly drained Bluford soils at the head of drainageways and on concave side slopes above the Ava soil. Also included are small areas of eroded Ava soils on the somewhat steeper side slopes. Included soils make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Ava soil at a moderate rate and through the lower part at a very slow rate. Surface runoff is medium. The seasonal high water table is perched at a depth of 1.5 to 3.5 feet from January through April in most years. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to use as a site for dwellings without basements. It is poorly suited to use as a site for

dwellings with basements or for septic tank absorption fields.

Measures that control erosion are needed in the areas used for soybeans, corn, or small grain. Contour farming, terraces, and a system of conservation tillage that leaves crop residue on the surface after planting help to control erosion. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Adapted pasture and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction, and increases the runoff rate and the hazard of erosion. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function well because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIe.

14B2—Ava silt loam, 2 to 5 percent slopes, eroded. This gently sloping, moderately well drained soil is on ridges and side slopes in the uplands. Individual areas are long and narrow and range from 2 to 40 acres in size.

Typically, the surface layer is yellowish brown, friable silt loam about 4 inches thick. It has been thinned by erosion. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown silty clay loam. The lower part is strong brown, mottled silty clay loam and brittle silt loam. Some areas have gray mottles in the upper part of the subsoil. In places, the soil is severely eroded and the surface layer has a higher content of clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Blair soils. These soils contain more sand in the subsoil than the Ava soil. They are on side slopes below the Ava soil. They make up about 10 percent of the unit.

Water and air move through the upper part of the Ava soil at a moderate rate and through the lower part at a very slow rate. Surface runoff is medium. The seasonal high water table is perched at a depth of 1.5 to 3.5 feet from January through April in most years. Available water capacity is moderate. Organic matter content is low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to use as a site for dwellings without basements. It is poorly suited to use as a site for dwellings with basements or for septic tank absorption fields.

Measures that control erosion are needed in the areas used for soybeans, corn, or small grain. Contour farming, terraces, and a system of conservation tillage that leaves crop residue on the surface after planting help to control erosion. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Adapted pasture and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction, and increases the runoff rate and the hazard of erosion. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function well because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIe.

14C2—Ava silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 2 to 40 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. It has been thinned by erosion. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown, friable silty clay loam. The next part is yellowish brown, mottled, firm silty clay loam. The lower part is strong brown and brown, mottled, firm, slightly brittle loam. In some places the subsoil has reddish colors and is not brittle. In other places the underlying material formed in residuum derived from sandstone. Some areas are

severely eroded and have more clay in the surface layer.

Included with this soil in mapping are small areas of the somewhat poorly drained Blair soils. These soils contain more sand in the subsoil than the Ava soil. They are on side slopes below the Ava soil. Also included are soils in seepy areas near the base of some slopes. Included soils make up 10 to 15 percent of the unit.

Water and air move through the upper part of the Ava soil at a moderate rate and through the lower part at a very slow rate. Surface runoff is rapid. The seasonal high water table is perched at a depth of 1.5 to 3.5 feet from January through April in most years. Available water capacity is moderate. Organic matter content is low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for pasture or woodland. Some areas are used for cultivated crops. This soil is moderately suited to cultivated crops, pasture, and hay and to use as a site for dwellings without basements. It is poorly suited to use as a site for dwellings with basements or for septic tank absorption fields.

Measures that control erosion are needed in the areas used for soybeans, corn, or small grain. Contour farming, terraces, and a system of conservation tillage that leaves crop residue on the surface after planting help to control erosion. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Adapted forage crops grow well on this soil if properly managed. Overgrazing or grazing when the soil is wet reduces yields and increases the runoff rate and the hazard of erosion. Establishing new stands can be difficult because the soil tends to puddle and crust. Applications of fertilizer should be based on the results of soil tests, and seed should be applied at recommended rates. Leaving crop residue on the surface and planting nurse crops help to control erosion until the seedlings are established. New stands should not be grazed or clipped until they are well established. Proper stocking rates, rotation grazing, and proper fertilization help to keep the pasture in good condition.

If this soil is used as woodland, protection from fire and from grazing by livestock is essential. Competition from undesirable vegetation can be controlled by chemical or mechanical means.

The seasonal high water table, the shrink-swell potential, and the slope are limitations if this soil is used as a site for dwellings. The seasonal high water table can be lowered by installing tile drains around the base of foundations. Reinforcing foundations and widening and backfilling the foundation trench with suitable material help to prevent the structural damage caused by shrinking and swelling. Land shaping helps to overcome the slope. The hazard of erosion can be reduced during construction by leaving as much vegetation on the surface as possible. Disturbed areas should be seeded or sodded.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function well because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIIe.

14C3—Ava silty clay loam, 5 to 10 percent slopes, severely eroded. This sloping, moderately well drained soil is on side slopes in the uplands. In most areas, the original surface layer has been removed by erosion and tillage has mixed the remaining surface layer with the upper part of the subsoil. Individual areas of this soil are irregular in shape and range from 5 to 30 acres in size.

Typically, the surface layer is dark yellowish brown, friable silty clay loam about 3 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown, firm silty clay loam. The next part is yellowish brown, firm, slightly brittle silty clay loam. The lower part is strong brown, mottled, firm, slightly brittle loam. In some areas the subsoil has more sand. In other areas sandstone or shale residuum is in the subsoil.

Included with this soil in mapping are small areas of the somewhat poorly drained Blair soils. These soils contain more sand in the subsoil than the Ava soil. They are on side slopes below the Ava soil. Also included are small areas of soils that formed in silty alluvium on narrow flood plains along drainageways. Included soils make up 10 to 15 percent of the unit.

Water and air move through the upper part of the Ava soil at a moderate rate and through the lower part at a very slow rate. Surface runoff is rapid. The seasonal high water table is perched at a depth of 1.5 to 3.5 feet from January through April in most years. Available water capacity is moderate. Organic matter content is low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay and to use as a site for dwellings without basements. It is poorly suited to use as a site for dwellings with basements or for septic tank absorption fields.

Unless the surface is protected, further erosion is a severe hazard in the areas used for soybeans, corn, or

small grain. Contour farming, a system of conservation tillage that leaves crop residue on the surface after planting, or a crop rotation that is dominated by forage crops helps to control erosion. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain tilth.

Adapted forage crops grow well on this soil if properly managed. Overgrazing or grazing when the soil is wet reduces yields and increases the runoff rate and the hazard of erosion. Establishing new stands can be difficult because the soil tends to puddle and crust. Applications of fertilizer should be based on the results of soil tests, and seed should be applied at recommended rates. Leaving crop residue on the surface and planting nurse crops help to control erosion until the seedlings are established. New stands should not be grazed or clipped until they are well established. Proper stocking rates, rotation grazing, and proper fertilization help to keep the pasture in good condition.

The seasonal high water table, the shrink-swell potential, and the slope are limitations if this soil is used as a site for dwellings. The seasonal high water table can be lowered by installing tile drains around the base of foundations. Reinforcing foundations and widening and backfilling the foundation trench with suitable material help to prevent the structural damage caused by shrinking and swelling. Land shaping helps to overcome the slope. The hazard of erosion can be reduced during construction by leaving as much vegetation on the surface as possible. Disturbed areas should be seeded or sodded.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function well because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IVe.

15B—Parke silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on narrow ridges on outwash plains. Individual areas are irregular in shape and range from 5 to about 50 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown, friable silt loam. The next part is strong brown, firm silty clay loam. The lower part is strong brown and yellowish red, friable loam. In some areas, the subsoil has gray mottles and permeability is slower.

Included with this soil in mapping are small areas of the moderately well drained, very slowly permeable Ava soils on slopes below the Parke soil. These soils have a fragipan in the lower part of the subsoil. They make up 5 to 10 percent of the unit.

Water and air move through the Parke soil at a moderate rate. Surface runoff is medium. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Other areas are used for hay and pasture. This soil is well suited to cultivated crops, hay, and pasture and to use as a site for dwellings or for septic tank absorption fields.

Measures that control erosion are needed in the areas used for corn, soybeans, or small grain. Suitable practices include contour farming, terraces, and a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Adapted pasture and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction, and increases the runoff rate and the hazard of erosion. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

Properly designed and installed septic tank absorption fields can function well in areas of this soil.

The land capability classification is IIe.

15C2—Parke silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on narrow ridges and side slopes on outwash plains. Individual areas are irregular in shape and range from 5 to more than 50 acres in size.

Typically, the surface layer is dark yellowish brown, friable silt loam about 6 inches thick. It has been thinned by erosion. The subsoil extends to a depth of 60 inches or more. The upper part is strong brown, firm silty clay loam. The next part is yellowish brown, firm silt loam. The lower part is strong brown and yellowish red, friable loam. In places the subsoil contains more sand. In some areas the lower part of the subsoil is firm and brittle. Other areas are severely eroded and have a surface layer of silty clay loam.

Included with this soil in mapping are small areas of the moderately well drained, very slowly permeable Ava

soils on slopes below the Parke soil. These soils have a fragipan in the lower part of the subsoil. They make up 5 to 10 percent of the unit.

Water and air move through the Parke soil at a moderate rate. Surface runoff is medium. Available water capacity is high. Organic matter content is low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture and hay. This soil is moderately suited to cultivated crops and to use as a site for dwellings or for septic tank absorption fields. It is well suited to pasture and hay.

Measures that control erosion are needed in the areas used for corn, soybeans, or small grain. Suitable practices include contour farming, terraces, a system of conservation tillage that leaves crop residue on the surface after planting, and a crop rotation that includes 1 or more years of grasses and legumes. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and help to maintain tilth.

Adapted forage crops grow well on this soil if properly managed. Overgrazing or grazing when the soil is wet reduces yields and increases the runoff rate and the hazard of erosion. Establishing new stands can be difficult because the soil tends to puddle and crust. Applications of fertilizer should be based on the results of soil tests, and seed should be applied at recommended rates. Leaving crop residue on the surface and planting nurse crops help to control erosion until the seedlings are established. New stands should not be grazed or clipped until they are well established. Proper stocking rates, rotation grazing, and proper fertilization help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the slope is a limitation. On sites for dwellings without basements, the shrink-swell potential also is a limitation. Land shaping helps to overcome the slope. Reinforcing the foundation or extending it below the subsoil helps to prevent the damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems can function adequately, but serial distribution of absorption trenches is necessary.

The land capability classification is IIIe.

109—Racoon silt loam. This nearly level, poorly drained soil is on foot slopes and in small depressions in the uplands and on stream terraces. It is subject to brief periods of ponding from December through April. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is dark grayish brown, mottled, friable silt loam about 8 inches thick. The subsurface layer is light brownish gray, mottled, friable silt loam about 19 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is light brownish gray, mottled, firm silty clay loam. The lower part is mottled light brownish gray and strong brown, friable silt loam. In some areas the subsoil contains more clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Bluford soils and the poorly drained, frequently flooded Bonnie soils. Bluford soils are on ridges above the Racoon soil. Bonnie soils are on flood plains below the Racoon soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Racoon soil at a slow rate. Surface runoff is slow to ponded. The seasonal high water table is 0.5 foot above to 1.0 foot below the surface from December through April in most years. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to use as a site for dwellings or for septic tank absorption fields because of the ponding.

This soil is sufficiently drained for corn, soybeans, and small grain. Additional drainage is needed in some areas. Measures that maintain the drainage system are needed. A combination of surface ditches and land leveling can reduce the wetness. Tilling when the soil is wet causes surface compaction and decreases the rate of water infiltration. Soil that is bare of vegetation tends to puddle after intense rainfall and to form a crust as it dries. Returning crop residue to the soil, adding other organic material, and minimizing tillage increase the infiltration rate and help to maintain good tilth. Winter wheat and hay crops are subject to frost heave in some years.

If this soil is used for hay and pasture, the wetness limits the choice of plants and the period of grazing or cutting. Shallow ditches and land smoothing can reduce the wetness. Applications of fertilizer, weed control, rotation grazing, proper stocking rates, and timely harvesting help to keep the pasture or hayland in good condition.

The seasonal high water table and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the

footings helps to lower the water table. Elevating the floor of dwellings above the surrounding ground level, grading, and diverting surface water from the site also help to overcome the wetness.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function well because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIIw.

301B—Grantsburg silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridges and knolls in the uplands. Individual areas are irregular in shape and range from 5 to about 80 acres in size.

Typically, the surface layer is dark brown, very friable silt loam about 8 inches thick. The subsurface layer is yellowish brown, friable silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown, friable silty clay loam. The next part is yellowish brown, mottled, firm silty clay loam and friable silt loam. The lower part is yellowish brown, mottled, firm, slightly brittle silt loam. Some areas are eroded, have a thinner surface layer that is mixed with the subsoil, and have no subsurface layer. Some areas have slopes of more than 5 percent and have soft sandstone and shale within a depth of 5 feet.

Included with this soil in mapping are small areas of somewhat poorly drained soils in the lower positions on the landscape and at the head of drainageways. These soils make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Grantsburg soil at a moderate rate and through the lower part at a very slow rate. Surface runoff is medium. The seasonal high water table is perched at a depth of 1.5 to 3.5 feet from February through April in most years. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops or pasture. Many of the narrow ridgetops are wooded or are brushy, idle land. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

Measures that control erosion are needed in the areas used for corn, soybeans, or small grain. Suitable practices include contour farming, terraces, and a system of conservation tillage that leaves crop residue on the surface after planting. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Adapted pasture and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction, and increases the runoff rate and the hazard of erosion. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function properly because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIe.

337—Creal silt loam. This nearly level, somewhat poorly drained soil is on foot slopes and stream terraces. Individual areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is mottled, friable silt loam about 21 inches thick. The upper part is light yellowish brown, and the lower part is light brownish gray. The subsoil extends to a depth of 60 inches or more. It is light brownish gray, mottled, firm silty clay loam. In some areas, the subsurface layer is thinner and the subsoil contains more clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Banlic and Belknap soils and the poorly drained Racoon soils. Banlic and Belknap soils are on flood plains below the Creal soil. Racoon soils are in landscape positions similar to or slightly lower than those of the Creal soil. Included soils make up 8 to 10 percent of the unit.

Water and air move through the Creal soil at a moderately slow rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet from January through April in most years. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

In areas used for corn, soybeans, or small grain, the

seasonal high water table delays planting in some years. Surface ditches, diversions, and land leveling help to remove excess water. Tilling when the soil is wet causes surface cloddiness and compaction and increases the runoff rate. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

Adapted forage and hay plants grow well on this soil. Overgrazing or grazing when the soil is too wet reduces forage yields and causes surface compaction. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function properly because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIw.

340C3—Zanesville silt loam, 5 to 10 percent slopes, severely eroded. This sloping, moderately well drained soil is on side slopes in the uplands. In most areas, the original surface layer has been removed by erosion and tillage has mixed the remaining surface layer with the upper part of the subsoil. Individual areas of this soil are irregular in shape and range from 5 to more than 80 acres in size.

Typically, the surface layer is mixed dark brown and yellowish brown, friable silt loam about 4 inches thick. The subsoil is yellowish brown to a depth of 60 inches or more. The upper part is firm silty clay loam. The next part is mottled, firm, slightly brittle silty clay loam and silt loam. The lower part is mottled, firm loam. In some areas a layer of glacial till overlies the bedrock.

Included with this soil in mapping are areas of soils that have gray mottles in the upper part of the subsoil. These soils generally occur as seep areas on the lower part of side slopes. Also included are areas that have sandstone residuum within a depth of 40 inches and have more sand in the subsoil than the Zanesville soil. Included soils make up 10 to 15 percent of the unit.

Water and air move through the upper part of the Zanesville soil at a moderate rate and through the lower part at a slow rate. Surface runoff is medium. The seasonal high water table is perched at a depth of 2 to 3 feet from January through April in most years. Available water capacity is moderate. Organic matter content is low. The shrink-swell potential also is low.

Most areas are used for cultivated crops. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay and to use as a site for dwellings without basements. It is poorly suited to use as a site for dwellings with basements or for septic tank absorption fields.

Unless the surface is protected, the hazard of further erosion is severe if this soil is used for soybeans, corn, or small grain. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, or a crop rotation that is dominated by forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

Adapted forage crops grow well on this soil if properly managed. Overgrazing or grazing when the soil is wet reduces yields and increases the runoff rate and the hazard of erosion. Establishing new stands can be difficult because the soil tends to puddle and crust. Applications of fertilizer should be based on the results of soil tests, and seed should be applied at recommended rates. Leaving crop residue on the surface and planting nurse crops help to control erosion until the seedlings are established. New stands should not be grazed or clipped until they are well established. Proper stocking rates, rotation grazing, and proper fertilization help to keep the pasture in good condition.

The seasonal high water table, the shrink-swell potential, and the slope are limitations if this soil is used as a site for dwellings. The seasonal high water table can be lowered by installing tile drains around the base of foundations. Reinforcing foundations and widening and backfilling the foundation trench with suitable material help to prevent the structural damage caused by shrinking and swelling. Cutting and filling help to overcome the slope. The hazard of erosion can be reduced during construction by leaving as much vegetation on the surface as possible. Disturbed areas should be seeded or sodded.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function well because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IVe.

340D2—Zanesville silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, moderately well drained soil is on side slopes in the uplands. Individual

areas are irregular in shape and range from 3 to more than 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 3 inches thick. It has been thinned by erosion. The subsurface layer is yellowish brown, friable silt loam about 3 inches thick. The subsoil is about 35 inches thick. The upper part is yellowish brown, friable silt loam and firm silty clay loam. The lower part is yellowish brown, pale brown, and grayish brown, mottled, firm, slightly brittle silty clay loam and clay loam.

Included with this soil in mapping are small areas of the well drained Frondorf soils. These soils do not have brittle layers in the lower part of the subsoil. They are on side slopes below the Zanesville soil. Also included are areas of soils that have gray mottles in the upper part of the subsoil and are wetter than the Zanesville soil. These soils occur as seep areas on the lower part of side slopes. Included soils make up 10 to 15 percent of the unit.

Water and air move through the upper part of the Zanesville soil at a moderate rate and through the lower part at a slow rate. Surface runoff is rapid. The seasonal high water table is perched at a depth of 2 to 3 feet from January through April in most years. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential is low.

Most areas are used for pasture or woodland. This soil is poorly suited to cultivated crops and to use as a site for dwellings or for septic tank absorption fields. It is moderately suited to pasture, hay, and woodland.

Further erosion is a hazard in areas used for corn, soybeans, or small grain. A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a crop rotation that includes several years of forage crops helps to control erosion. Incorporating additional organic material into the soil improves tilth and minimizes crusting.

Adapted forage crops grow well on this soil if properly managed. Overgrazing or grazing when the soil is wet reduces yields and increases the runoff rate and the hazard of erosion. Establishing new stands can be difficult because the soil tends to puddle and crust. Applications of fertilizer should be based on the results of soil tests, and seed should be applied at recommended rates. Leaving crop residue on the surface and planting nurse crops help to control erosion until the seedlings are established. New stands should not be grazed or clipped until they are well established. Proper stocking rates, rotation grazing, and proper fertilization help to keep the pasture in good condition.

In areas used as woodland, protection from fire and from grazing by livestock is essential. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

The seasonal high water table, the shrink-swell potential, and the slope are limitations if this soil is used as a site for dwellings. The seasonal high water table can be lowered by installing tile drains around the base of foundations. Reinforcing foundations and widening and backfilling the foundation trench with suitable material help to prevent the structural damage caused by shrinking and swelling. Cutting and filling help to overcome the slope. The hazard of erosion can be reduced during construction by leaving as much vegetation on the surface as possible. Disturbed areas should be seeded or sodded.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function well because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IVe.

340D3—Zanesville silt loam, 10 to 15 percent slopes, severely eroded. This strongly sloping, moderately well drained soil is on side slopes in the uplands. In most areas, the original surface layer has been removed by erosion and tillage has mixed the remaining surface layer with the upper part of the subsoil. Individual areas of this soil are irregular in shape and range from 3 to more than 80 acres in size.

Typically, the surface layer is yellowish brown, friable silt loam about 4 inches thick. The subsoil is about 36 inches thick. It is firm. The upper part is brownish yellow and yellowish brown silty clay loam and silt loam. The next part is light yellowish brown and yellowish brown, brittle silt loam. The lower part is yellowish brown, mottled loam. The underlying material to a depth of 60 inches or more is yellowish brown, weathered sandstone and shale. In some areas a thin layer of glacial till overlies the bedrock.

Included with this soil in mapping are small areas of the well drained Frondorf soils. These soils do not have brittle layers in the lower part of the subsoil. They are on side slopes below the Zanesville soil. Also included are areas of soils that have gray mottles in the upper part of the subsoil and are wetter than the Zanesville soil. These soils occur as seep areas on the lower part of side slopes. Included soils make up 10 to 15 percent of the unit.

Water and air move through the upper part of the Zanesville soil at a moderate rate and through the lower part at a slow rate. Surface runoff is rapid. The seasonal high water table is perched at a depth of 2 to 3 feet during January through April in most years.

Available water capacity is moderate. Organic matter content is low. The shrink-swell potential also is low.

Most areas are used for cultivated crops or pasture. Some areas are idle land and support brush. This soil is unsuited to cultivated crops. It is moderately suited to pasture, hay, and woodland and to use as a site for dwellings without basements. It is poorly suited to use as a site for dwellings with basements or for septic tank absorption fields.

Adapted grasses and legumes grow well on this soil. Also, they are effective in controlling erosion if properly managed. Seedbed preparation is difficult on severely eroded side slopes. A no-till method of seeding or pasture renovation helps to establish forage species and reduces the hazard of erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, deferred grazing during wet periods, and applications of fertilizer help to keep the pasture in good condition.

The seasonal high water table, the shrink-swell potential, and the slope are limitations if this soil is used as a site for dwellings. The seasonal high water table can be lowered by installing tile drains around the base of foundations. Reinforcing foundations and widening and backfilling the foundation trench with suitable material help to prevent the structural damage caused by shrinking and swelling. Cutting and filling help to overcome the slope. The hazard of erosion can be reduced during construction by leaving as much vegetation on the surface as possible. Disturbed areas should be seeded or sodded.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function properly because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is VIe.

432—Geff silt loam. This nearly level, somewhat poorly drained soil is on stream terraces. Individual areas are irregular in shape and range from 5 to 20 acres in size.

Typically, the surface layer is brown or dark brown, friable silt loam about 10 inches thick. The subsurface layer is brown, mottled, friable silt loam about 5 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is yellowish brown, friable silty clay loam. The next part is light brownish gray and yellowish brown, friable silty clay loam and silt loam. The lower part is yellowish brown, friable, stratified loam and sandy loam. Some areas are not stratified within a depth of 60 inches.

Included with this soil in mapping are small areas of the poorly drained Racoon soils. These soils are in low areas below the Geff soil. They make up 2 to 10 percent of the unit.

Water and air move through the Geff soil at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet from January through April in most years. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If this soil is used for corn or soybeans, wetness delays planting in some years. Surface ditches and land leveling help to remove excess water. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

If this soil is used as a site for dwellings, the wetness, the seasonal high water table, and the shrink-swell potential are limitations. Reinforcing footings and foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface drains around the footings helps to lower the water table.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems do not function properly because of the restricted permeability and the seasonal high water table. An approved alternative system should be used.

The land capability classification is IIw.

434B—Ridgway silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on crests and side slopes on stream terraces. Individual areas are irregular in shape and range from 3 to about 100 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. The subsoil is about 45 inches thick. The upper part is yellowish brown, friable and firm silt loam and silty clay loam. The lower part is yellowish brown and brown, friable fine sandy loam and fine sandy loam and has thin strata of loam and loamy fine sand. The underlying material to a depth of 60 inches or more is stratified yellowish brown, friable loamy fine sand and strong brown, friable fine sandy loam. In some areas the surface layer and the upper part of the subsoil have more sand.

Included with this soil in mapping are small areas of severely eroded Ridgway soils on side slopes. Also included, in small depressions, are areas of soils that have gray mottles. Included soils make up 2 to 10 percent of the unit.

Water and air move through the upper part of the

Ridgway soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is medium. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops and to use as a site for dwellings or for septic tank absorption fields.

Measures that control erosion are needed in the areas used for corn, soybeans, or small grain. A system of conservation tillage that leaves crop residue on the surface after planting, terraces, and contour farming help to control erosion. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and fertility.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Also, access may be difficult at times because the soil is adjacent to soils that are subject to flooding. Extending the footings into the subsoil or reinforcing the foundations helps to prevent the damage caused by shrinking and swelling.

The land capability classification is IIe.

585D3—Negley silt loam, 10 to 15 percent slopes, severely eroded. This strongly sloping, well drained soil is on side slopes on outwash plains. In most areas, the original surface layer has been removed by erosion and tillage has mixed the remaining surface layer with the upper part of the subsoil. Individual areas of this soil are irregular in shape and range from 5 to about 50 acres in size.

Typically, the surface layer is dark yellowish brown, friable silt loam about 6 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is strong brown, firm loam. The lower part is yellowish red, firm sandy loam. In some areas the surface layer is loam. In other areas the subsoil is gravelly loam or gravelly sandy loam.

Included with this soil in mapping are small areas of Parke soils on the upper part of side slopes and on narrow ridges above the Negley soil. Also included are areas of alluvial soils on flood plains along drainageways. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Negley soil at a moderately rapid rate. Surface runoff is rapid. Available water capacity is moderate. Organic matter content is low. The shrink-swell potential also is low, and the potential for frost action is moderate.

Most areas are used for pasture and hay. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay and to use as a site for dwellings or for septic tank absorption fields.

Unless the surface is protected, the hazard of further erosion is severe in the areas used for corn, soybeans, or small grain. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting, terraces, contour farming, or a crop rotation that is dominated by forage crops. Tilling when the soil is wet causes surface cloddiness and compaction and results in excessive runoff and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

Adapted forage crops grow well on this soil if properly managed. Overgrazing or grazing when the soil is wet reduces yields and increases the runoff rate and the hazard of erosion. Establishing new stands can be difficult because the soil tends to puddle and crust. Applications of fertilizer should be based on the results of soil tests, and seed should be applied at recommended rates. Leaving crop residue on the surface and planting nurse crops help to control erosion until the seedlings are established. New stands should not be grazed or clipped until they are well established. Proper stocking rates, rotation grazing, and proper fertilization help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the slope is a limitation. The shrink-swell potential is an additional limitation on sites for dwellings without basements. Land shaping helps to overcome the slope. Reinforcing the foundation or extending it below the subsoil helps to prevent the damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, subsurface seepage systems can function adequately, but serial distribution of absorption trenches is necessary.

The land capability classification is IVe.

585F—Negley loam, 20 to 45 percent slopes. This steep, well drained soil is on side slopes on outwash plains. Individual areas are irregular in shape and range from 5 to more than 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 2 inches thick. The subsurface layer is brown, friable loam about 6 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is brown and strong brown, friable loam. The lower part is strong brown, friable sandy loam and gravelly sandy loam. In some areas the surface layer and subsurface layer have more sand.

Included with this soil in mapping are small areas of Parke soils on the upper part of side slopes and on narrow ridges above the Negley soil. Also included are areas of somewhat poorly drained alluvial soils on flood

plains along drainageways. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Negley soil at a moderately rapid rate. Surface runoff is rapid. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is moderate.

Most areas are wooded or are used for pasture. This soil is not suited to cultivated crops or to use as a site for dwellings or for septic tank absorption fields.

Adapted forage plants grow well on this soil, and a permanent cover of pasture plants helps to control erosion and maintains tilth. Erosion control is needed when grasses and legumes are established. In areas where the pasture is already established, seeding legumes on the contour using a no-till drill and applying the needed fertilizer improve forage quality. When new stands of grasses and legumes are being established, fertilizer should be applied according to the results of soil tests and the existing vegetative cover should be disturbed as little as possible. In some areas mulching may be required. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

This soil is not suited to onsite waste disposal systems or to building site development because of the slope.

The land capability classification is VIe.

786E—Frondorf silt loam, 15 to 20 percent slopes. This moderately steep, well drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 5 to about 80 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 3 inches thick. The subsurface layer is yellowish brown, friable silt loam about 3 inches thick. The subsoil is about 22 inches thick. The upper part is yellowish brown, friable silt loam, and the lower part is yellowish brown, friable channery loam and channery silty clay loam. The underlying material to a depth of 60 inches or more is weathered sandstone and shale. In some areas the surface layer is loam.

Included with this soil in mapping are areas of soils that are shallow over bedrock. These soils are in landscape positions similar to those of the Frondorf soil. Also included are small areas of rock outcrop near the base of some slopes and small areas of alluvial soils on flood plains along drainageways. Included areas make up 5 to 15 percent of the unit.

Water and air move through the Frondorf soil at a moderate rate. Surface runoff is rapid. Available water capacity is low. Organic matter content is moderately low. The shrink-swell potential is low.

Most areas are used for pasture or woodland. This soil is moderately suited to pasture and woodland. It is unsuited to cultivated crops and to use as a site for dwellings or for septic tank absorption fields because of the slope and the depth to bedrock.

Adapted forage plants grow well on this soil, and a permanent cover of pasture plants helps to control erosion and maintains tilth. Erosion control is needed when grasses and legumes are established. In areas where the pasture is already established, seeding legumes on the contour using a no-till drill and applying the needed fertilizer improve forage quality. When new stands of grasses and legumes are being established, fertilizer should be applied according to the results of soil tests and the existing vegetative cover should be disturbed as little as possible. In some areas mulching may be required. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as woodland, protection from fire and from grazing by livestock is essential. Logging roads and skid trails should be established on the contour as much as possible. Water bars are needed to divert surface water from logging roads and skid trails. Firebreaks should be the grass type and should be established on the contour as much as possible. Bare logging areas should be seeded to grass or to a grass-legume mixture. The use of machinery should be limited to periods when the soil is firm enough to support the equipment. If trees are planted in areas of bare soils, a cover of grasses should be established between the rows. If a mechanical planter is used, the trees should be planted on the contour. Planting in furrows, using larger plants, or mulching reduces the seedling mortality rate. Some replanting may be needed. Competing vegetation can be controlled by chemical means.

This soil is unsuited to onsite waste disposal and to building site development because of the slope.

The land capability classification is IVe.

786F—Frondorf silt loam, 20 to 30 percent slopes. This steep, well drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 5 to about 80 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 5 inches thick. The subsurface layer is light yellowish brown, friable silt loam about 5 inches thick. The subsoil is about 24 inches thick. The upper part is yellowish brown, friable silt loam, and the lower part is yellowish brown, friable channery loam. The underlying material to a depth of 60 inches or more is weathered sandstone, siltstone, and shale. In places

the subsoil formed mostly in shale residuum and contains more clay. In some areas the surface layer is loam.

Included with this soil in mapping are areas of soils that are shallow over bedrock. These soils are in landscape positions similar to those of the Frondorf soil. Also included are small areas of rock outcrop near the base of some slopes and small areas of alluvial soils on flood plains along drainageways. Included areas make up 5 to 15 percent of the unit.

Water and air move through the Frondorf soil at a moderate rate. Surface runoff is rapid. Available water capacity is low. Organic matter content is moderately low. The shrink-swell potential is low.

Most areas are used for woodland or pasture. This soil is moderately suited to woodland and pasture. It is unsuited to cultivated crops and to use as a site for dwellings or for septic tank absorption fields because of the slope and the depth to bedrock.

Adapted forage plants grow well on this soil, and a permanent cover of pasture plants helps to control erosion and maintains tilth. Erosion control is needed when grasses and legumes are established. In areas where the pasture is already established, seeding legumes on the contour using a no-till drill and applying the needed fertilizer improve forage quality. When new stands of grasses and legumes are being established, fertilizer should be applied according to the results of soil tests and the existing vegetative cover should be disturbed as little as possible. In some areas mulching may be required. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as woodland, protection from fire and from grazing by livestock is essential. Logging roads and skid trails should be on the contour as much as possible. Water bars are needed to divert surface water from logging roads and skid trails. Firebreaks should be the grass type and should be established on the contour as much as possible. Bare logging areas should be seeded to a grass-legume mixture. The use of machinery should be limited to periods when the soil is firm enough to support the equipment. If trees are planted in areas of bare soils, a cover of grass should be established between the rows. If a mechanical planter is used, the trees should be planted on the contour. Planting in furrows, using larger plants, or mulching reduces the seedling mortality rate. Some replanting may be needed. Competing vegetation can be controlled by mechanical methods.

This soil is unsuited to onsite waste disposal and to building site development because of the slope.

The land capability classification is VIe.

1108—Bonnie silt loam, wet. This nearly level, very poorly drained soil is in sloughs and in broad, low areas on flood plains. It is frequently flooded for long periods from December through March. Individual areas are long and narrow or irregular in shape and range from 10 to 200 acres in size.

Typically, the surface layer is grayish brown, mottled, friable silt loam about 4 inches thick. The underlying material to a depth of 60 inches or more is gray, mottled, friable and firm silt loam. In some areas the soil is less acid. In places the underlying material has strata of silty clay loam and loam.

Included with this soil in mapping are small areas of soils that are not ponded for long periods. These soils are in the slightly higher positions on the flood plains. They make up about 5 percent of the unit.

Water and air move through the Bonnie soil at a moderately slow rate. Surface runoff is ponded. The seasonal high water table is 0.5 foot above to 1.0 foot below the surface from January through June in most years. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

Most areas are used as woodland. This soil is moderately suited to woodland. It is well suited to habitat for wetland wildlife. It is unsuited to cultivated crops, pasture, and hay and to use as a site for dwellings or for septic tank absorption fields because of the flooding and ponding.

If this soil is used as woodland, an equipment limitation, seedling mortality, and windthrow are management concerns because of the wetness. Plant competition also is a concern. It affects the seedlings of desirable species. The use of machinery should be limited to periods when the soil is firm enough to support the equipment. Using harvesting methods that do not isolate the remaining trees or leave them widely spaced reduces the windthrow hazard. In openings where timber has been harvested, competition from undesirable species can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees. Measures that protect the woodland from fire are needed.

Many areas provide good habitat for wetland wildlife. Some shallow water areas are available, and others could be easily developed. Wild herbaceous plants and shrubs grow naturally in most areas.

The land capability classification is Vw.

1524—Zipp silty clay loam, wet. This nearly level, very poorly drained soil is in sloughs and in broad, low areas on flood plains. It is frequently flooded for long periods from December through March. Individual areas

are long and narrow or irregular in shape and range from 10 to 50 acres in size.

Typically, the surface layer is dark gray, mottled, firm silty clay loam about 3 inches thick. The subsoil is about 39 inches thick. It is gray, mottled, firm silty clay. The underlying material to a depth of 60 inches or more also is gray, mottled, firm silty clay.

Water and air move through this soil at a slow rate. Surface runoff is ponded. The seasonal high water table is 0.5 foot above to 1.0 foot below the surface from December through May in most years. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is high, and the potential for frost action is moderate.

Most areas are used as woodland. This soil is moderately suited to woodland. It is well suited to habitat for wetland wildlife. It is unsuited to cultivated crops, pasture, and hay and to use as a site for dwellings or for septic tank absorption fields because of the flooding and ponding.

If this soil is used as woodland, an equipment limitation, seedling mortality, and windthrow are management concerns because of the wetness. Plant competition also is a concern. It affects the seedlings of desirable species. The use of machinery should be limited to periods when the soil is firm enough to support the equipment. Using harvesting methods that do not isolate the remaining trees or leave them widely spaced reduces the windthrow hazard. In openings where timber has been harvested, competition from undesirable species can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees. Measures that protect the woodland from fire are needed.

Many areas provide good habitat for wetland wildlife. Some shallow water areas are available, and others could be easily developed. Wild herbaceous plants and shrubs grow naturally in most areas.

The land capability classification is Vw.

3072—Sharon silt loam, frequently flooded. This nearly level, moderately well drained soil is on narrow flood plains or on natural levees along the major streams. It is frequently flooded for brief periods from December through March. Individual areas are long and narrow and range from 5 to about 80 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 8 inches thick. The subsurface layer is yellowish brown, friable silt loam about 6 inches thick. The underlying material to a depth of 60 inches or more is yellowish brown, friable silt loam. It is mottled in the lower part. In some areas the soil contains more sand.

Included with this soil in mapping are small areas of poorly drained soils in old stream channels that are ponded. These soils make up 2 to 5 percent of the unit.

Water and air move through the Sharon soil at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 3 to 6 feet from January through April in most years. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

In the areas used for corn or soybeans, flooding is a hazard. Because the flooding usually occurs during late winter and early spring, crop damage can be minimized by planting crops that have a shorter growing season and avoiding crops that are seeded in the fall, such as winter wheat. Minimizing tillage and returning crop residue to the soil help to maintain good tilth and increase the rate of water infiltration.

Adapted forage and hay crops grow well on this soil. Selecting suitable species for planting, using proper stocking rates, applying fertilizer, and restricting use during wet periods help to keep the pasture in good condition.

The land capability classification is IIw.

3108—Bonnie silt loam, frequently flooded. This nearly level, poorly drained soil is in broad, low areas on flood plains. It is frequently flooded for brief periods from December through March. Individual areas are long or irregularly shaped and range from 5 to more than 400 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The underlying material extends to a depth of 60 inches or more. The upper part is light gray and gray, mottled, friable silt loam, and the lower part is light gray and gray, mottled, friable silty clay loam. In some areas the soil is less acid. In other areas dense or brittle layers are at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Belknap and Banlic soils. These soils are in the slightly higher positions above the Bonnie soil. They make up 5 to 10 percent of the unit.

Water and air move through the Bonnie soil at a moderately slow rate. Surface runoff is slow. The seasonal high water table is 0.5 foot above to 1.0 foot below the surface from December through May in most years. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops, pasture, and hay. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

This soil is sufficiently drained for corn and soybeans. Flooding is a hazard. Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Surface ditches and land smoothing can reduce the wetness. Subsurface tile drains help to lower the water table, but they should be closely spaced because of the restricted permeability. Tilling when the soil is wet causes surface cloddiness and compaction. Minimizing tillage and returning crop residue to the soil help to maintain good tilth and increase the rate of water infiltration.

Adapted forage and hay plants grow well on this soil. Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields and causes surface compaction. Rotation grazing, deferred grazing during wet periods, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIIw.

3142—Patton silty clay loam, frequently flooded. This nearly level, poorly drained soil is in broad, low areas and in sloughs on low stream terraces and lake plains. It is frequently flooded for brief periods from December through March. Individual areas are irregular in shape and range from 5 to about 300 acres in size.

Typically, the surface layer is very dark brown, friable silty clay loam about 11 inches thick. The subsoil is about 39 inches thick. It is mottled. The upper part is dark gray and olive gray, firm silty clay loam. The next part is light gray, olive, and yellowish brown, firm silty clay loam. The lower part is light gray, firm, stratified silt loam and loam. The underlying material to a depth of 60 inches or more is light gray, mottled, firm, stratified silt loam and loam. In some areas a thin layer of silt loam overwash is on the surface.

Included with this soil in mapping are small areas of Evansville soils. These soils are lighter colored than the Patton soil. They are in the slightly higher positions above the Patton soil. Also included are some areas of somewhat poorly drained soils that have a darker surface layer than the Patton soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Patton soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is slow to ponded. The seasonal high water table is 0.5 foot above to 2.0 feet below the surface from December through May in most years. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. Because of the flooding, it is unsuited to dwellings and to septic tank absorption fields.

If this soil is used for corn or soybeans, the flooding and wetness delay planting in some years. The flooding occurs during late winter or early spring. It occurs during the growing season less than once in 2 years. Dikes or diversions minimize the crop damage caused by floodwater. Selecting varieties that are adapted to shorter growing seasons and wetter soil conditions also reduces the extent of crop damage. Subsurface tile drains reduce wetness if suitable outlets are available. Returning crop residue to the soil helps to maintain tilth. Tilling mainly in the fall allows the wetting and drying of the soil to break down large clods and results in easier seedbed preparation in the spring.

The land capability classification is IIIw.

3208—Sexton silt loam, frequently flooded. This nearly level, poorly drained soil is on low stream terraces. It is frequently flooded for brief periods from December through March. Individual areas are irregular in shape and range from 5 to more than 100 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is light gray, mottled, friable silt loam about 5 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is light gray, firm silty clay loam. The next part is light brownish gray and light gray, firm silty clay loam and silty clay. The lower part is mixed light gray and yellowish brown, friable, stratified very fine sandy loam and loam. In some areas, the subsurface layer is thicker and the subsoil contains less clay.

Water and air move through this soil at a slow rate. Surface runoff is slow. The seasonal high water table is within a depth of 2 feet from December through May in most years. The available water capacity is high. Organic matter content is moderate. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. This soil is suited to cultivated crops. It is unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn or soybeans, the flooding and wetness delay planting in some years. The flooding occurs during the growing season less than once in 2 years. Dikes or diversions minimize the damage caused by floodwater. Selecting varieties that are adapted to shorter growing seasons and wetter soil conditions also reduces the extent of crop damage. Surface ditches and land smoothing reduce wetness. Keeping tillage to a

minimum and returning crop residue to the soil help to maintain tilth.

The land capability classification is IIIw.

3231—Evansville silt loam, frequently flooded. This nearly level, poorly drained soil is on low stream terraces and lake plains. It is frequently flooded for brief periods from December through March. Individual areas are irregular in shape and range from 10 to more than 100 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 10 inches thick. The subsoil is gray, mottled, firm silty clay loam about 32 inches thick. The underlying material to a depth of 60 inches or more is light gray, mottled, friable silt loam.

Included with this soil in mapping are small areas of Patton soils. These soils are darker than the Evansville soil. They are in sloughs and in broad, low areas below the Evansville soil. Also included are some areas of the somewhat poorly drained Henshaw soils in the higher positions on the landscape. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Evansville soil at a moderate rate. Surface runoff is slow. The seasonal high water table is 0.5 foot above to 1.0 foot below the surface from December through May in most years. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It is unsuited to dwellings and to septic tank absorption fields because of the flooding.

If this soil is used for corn or soybeans, the flooding and wetness delay planting in some years. The flooding occurs during late winter or early spring. It occurs during the growing season less than once in 2 years. Dikes or diversions minimize the crop damage caused by floodwater. Selecting varieties that are adapted to shorter growing seasons and wetter soil conditions also reduces the extent of crop damage. Surface ditches and subsurface tile drains reduce the wetness. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth.

The land capability classification is IIw.

3288—Petrolia silty clay loam, frequently flooded. This nearly level, poorly drained soil is in broad, low areas on flood plains. It is frequently flooded for brief periods from December through April. Individual areas are long and narrow or irregular in shape and range from 10 to 260 acres in size.

Typically, the surface layer is dark grayish brown, firm silty clay loam about 6 inches thick. The underlying material to a depth of 60 inches or more is gray and light gray, mottled, firm silty clay loam. In some areas the soil is more acid.

Included with this soil in mapping are small areas of the poorly drained Bonnie and very poorly drained Zipp soils. Bonnie soils are in the slightly higher positions above the Petrolia soil. Zipp soils are in the slightly lower positions below the Petrolia soil. Included soils make up 8 to 10 percent of the unit.

Water and air move through the Petrolia soil at a moderately slow rate. Surface runoff is slow to ponded. The seasonal high water table is 0.5 foot above to 3.0 feet below the surface from December through May in most years. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

This soil is sufficiently drained for soybeans and corn. Measures that maintain or improve the drainage system are needed. Surface ditches or subsurface drains reduce the wetness. The flooding occurs during the growing season less than once in 2 years. Tilling mainly in the fall allows wetting and drying of the soil to break down large clods and results in easier seedbed preparation in the spring. Tilling when the soil is wet causes surface cloddiness and compaction. Minimizing tillage and returning crop residue to the soil help to maintain good tilth and increase the rate of water infiltration.

The land capability classification is IIIw.

3382—Belknap silt loam, frequently flooded. This nearly level, somewhat poorly drained soil is on flood plains. It is frequently flooded for brief periods from December through March. Individual areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 10 inches thick. The subsurface layer is dark brown, mottled, friable silt loam about 8 inches thick. The underlying material to a depth of 60 inches or more is mottled, friable silt loam. The upper part is light brownish gray, and the lower part is grayish brown.

Included with this soil in mapping are small areas of the poorly drained Bonnie and moderately well drained Sharon soils. Sharon soils are higher on the landscape than the Belknap soil. Bonnie soils are in old slough channels and in broad, low areas below the Belknap soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Belknap soil at a moderately slow rate. Surface runoff is slow. The

seasonal high water table is at a depth of 1 to 3 feet from January through April in most years. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

Most areas are used for cultivated crops. Some areas are used for pasture or woodland. This soil is well suited to cultivated crops, pasture, and woodland. It generally is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

In areas used for corn and soybeans, the seasonal high water table or the flooding delays planting in most years. The wetness can be reduced by surface ditches. The flooding occurs during the growing season less than once in 2 years. Tilling when the soil is wet causes surface cloddiness and compaction. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Adapted forage and hay plants grow well on this soil. Bromegrass, orchardgrass, tall fescue, and ladino clover are suitable species. Subsurface tile drains help to lower the seasonal high water table if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields and causes surface compaction. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIIw.

3420—Piopolis silty clay loam, frequently flooded. This nearly level, poorly drained soil is in broad, low areas on flood plains. It is frequently flooded for brief periods from December through March. Individual areas are irregular in shape and range from 10 to more than 300 acres in size.

Typically, the surface layer is dark grayish brown, mottled, friable silty clay loam about 7 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, firm silty clay loam. In some areas the underlying material contains more sand. In other areas the underlying material is less acid.

Included with this soil in mapping are small areas of the poorly drained Bonnie and Petrolia soils. Bonnie soils contain less clay than the Piopolis soil. They are in the slightly higher landscape positions, and thus they dry more quickly than the Piopolis soil. Petrolia soils are less acid than the Piopolis soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Piopolis soil at a slow rate. Surface runoff is slow to ponded. The seasonal high water table is 0.5 foot above to 3.0 feet below the surface from December through May in most years. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops, pasture, and hay. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

In most areas this soil is sufficiently drained for corn and soybeans. The flooding occurs during the growing season less than once in 2 years. Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Wetness can be reduced by surface ditches and land smoothing. Subsurface tile drains help to lower the water table, but they must be closely spaced because of the restricted permeability. Tilling when the soil is wet causes surface cloddiness and compaction. Minimizing tillage and returning crop residue to the soil help to maintain good tilth and increase the rate of water infiltration, but these practices may cause the soil to dry more slowly in the spring.

The land capability classification is IIIw.

3422—Cape silty clay loam, frequently flooded. This nearly level, poorly drained soil is in broad, low areas on flood plains and lake plains. It is frequently flooded for brief periods from December through March. Individual areas are oval or long and narrow and range from 10 to nearly 100 acres in size.

Typically, the surface layer is dark grayish brown, firm silty clay loam about 6 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled, firm silty clay. The upper part is gray, and the lower part is light gray. In some areas the subsoil contains less clay.

Included with this soil in mapping are areas of soils that are subject to flooding or ponding for long periods of time and are not sufficiently drained for normal crop production. Also included are areas of the very poorly drained Zipp soils. Zipp soils are less acid than the Cape soil and require less liming. They are in landscape positions similar to those of the Cape soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Cape soil at a very slow rate. Surface runoff is slow to ponded. The seasonal high water table is perched within a depth of 1 foot from December through May in most years. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential and the potential for frost action are high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops, hay, and pasture. It is generally unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

In most areas this soil is sufficiently drained for corn

and soybeans. The flooding occurs during the growing season less than once in 2 years. Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Wetness can be reduced by surface ditches. Tilling when the soil is wet causes surface cloddiness and compaction. Minimizing tillage and returning crop residue to the soil help to maintain good tilth and increase the rate of water infiltration, but these practices may cause the soil to dry more slowly in the spring. Tilling mainly in the fall allows wetting and drying of the soil to break down large clods and results in easier seedbed preparation in the spring.

The land capability classification is IIIw.

3482C—Uniontown silt loam, frequently flooded, 4 to 10 percent slopes, eroded. This sloping, moderately well drained soil is on side slopes on low stream terraces. It is frequently flooded for brief periods from December through March. Individual areas are long and narrow and range from 5 to 20 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. It has been thinned by erosion. The subsoil is about 47 inches thick. The upper part is yellowish brown, firm silty clay loam. The next part is yellowish brown, mottled, friable silt loam. The lower part is light brownish gray, mottled, friable silty clay loam. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable, stratified silt loam and silty clay loam. Some areas are severely eroded and have a surface layer of silty clay loam.

Included with this soil in mapping are small areas of the somewhat poorly drained Henshaw soils. These soils have a grayer subsoil than the Uniontown soil. They are in nearly level areas above the Uniontown soil. Also included are small areas of alluvial soils in drainageways below the Uniontown soil. Included soils make up about 10 to 15 percent of the unit.

Water and air move through the Uniontown soil at a moderate rate. Surface runoff is medium. The seasonal high water table is at a depth of 2.5 to 6.0 feet from January through April in most years. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

Measures that control erosion are necessary if this soil is used for cultivated crops. Erosion can be controlled by a system of conservation tillage that leaves crop residue on the surface after planting or by a crop rotation that includes at least 1 year of grasses or legumes. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity. The flooding delays planting in some years. It occurs during the growing season less than once in 2 years. Selecting crops that are adapted to a shorter growing season reduces the extent of crop damage caused by floodwater.

The land capability classification is IIIe.

3483—Henshaw silt loam, frequently flooded. This nearly level, somewhat poorly drained soil is on low stream terraces. It is frequently flooded for brief periods from December through March. Individual areas are irregular in shape and range from 5 to 55 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 8 inches thick. The subsoil is about 42 inches thick. It is mottled, firm silty clay loam. The upper part is yellowish brown and pale brown, and the lower part is light brownish gray. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, firm, stratified silt loam and loam. In some areas the upper part of the subsoil has gray matrix colors.

Included with this soil in mapping are small areas of the poorly drained Sexton and moderately well drained Uniontown soils. Sexton soils are in low areas below the Henshaw soil. Uniontown soils are on side slopes of terraces. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Henshaw soil at a moderately slow rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 2 feet from January through April in most years. Available water capacity is high. Organic matter content is low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops, hay, and pasture. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

If this soil is used for corn or soybeans, the flooding and wetness delay planting in some years. The flooding occurs during late winter or early spring. It occurs during the growing season less than once in 2 years. Dikes or diversions minimize the crop damage caused by floodwater. Selecting varieties that are adapted to shorter growing seasons and wetter soil conditions also reduces the extent of crop damage. Wetness can be reduced by ditches and tile drains. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth.

The land capability classification is IIIw.

3524—Zipp silty clay, frequently flooded. This nearly level, very poorly drained soil is in broad, low areas on flood plains and lake plains. It is frequently flooded for brief periods from December through March. Individual areas are oval and range from 20 to more than 100 acres in size.

Typically, the surface layer is dark grayish brown, mottled, firm silty clay about 8 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled, firm silty clay. The upper part is dark gray, and the lower part is gray.

Water and air move through this soil at a slow rate. Surface runoff is very slow or ponded. The seasonal high water table is 0.5 foot above to 1.0 foot below the surface from December through May in most years. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential is high, and the potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

A drainage system has been installed in the areas used for corn or soybeans. The flooding occurs only occasionally during the growing season. A combination of surface ditches and land leveling reduces the wetness. Measures that maintain the drainage system are needed. Tilling when the soil is wet causes surface cloddiness and compaction. Tilling mainly in the fall allows wetting and drying of the soil to break down large clods and results in easier seedbed preparation in the spring. Returning crop residue to the soil and minimizing tillage help to maintain tilth and increase the rate of water infiltration.

The land capability classification is IIIw.

3524+—Zipp silt loam, overwash, frequently flooded. This nearly level, very poorly drained soil is in broad, low areas on flood plains and lake plains. It is frequently flooded for brief periods from December through March. Individual areas are irregular in shape and range from 20 to more than 100 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 9 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is grayish brown, friable silty clay loam. The lower part is gray and light brownish gray, firm silty clay. In some areas the overwash material is loam.

Included with this soil in mapping are small areas of the poorly drained Bonnie soils. These soils are more silty than the Zipp soil. Also, they are closer to stream channels. They make up 8 to 10 percent of the unit.

Water and air move through the Zipp soil at a slow rate. Surface runoff is very slow or ponded. The seasonal high water table is 0.5 foot above to 1.0 foot below the surface from December through May in most years. Available water capacity is moderate. Organic matter content is moderately low. The shrink-swell potential is high, and the potential for frost action is moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

Most areas are sufficiently drained for corn and soybeans. The flooding occurs during the growing season less than once in 2 years. Wetness can be reduced by surface ditches or subsurface drains. Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Tilling when the soil is wet causes surface cloddiness and compaction. Minimizing tillage and returning crop residue to the soil help to maintain good tilth and increase the rate of water infiltration, but these practices may cause the soil to dry more slowly in the spring.

The land capability classification is IIIw.

3787—Banlic silt loam, frequently flooded. This nearly level, somewhat poorly drained soil is on low stream terraces and flood plains. It is frequently flooded for brief periods from December through March. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 8 inches thick. The subsurface layer is brown and light brownish gray, mottled, friable silt loam about 12 inches thick. The subsoil is light brownish gray, mottled silt loam about 25 inches thick. The upper part is friable, and the lower part is firm and brittle. The underlying material to a depth of 60 inches or more is brown, firm silt loam. In some areas the lower part of the subsoil is not brittle.

Included with this soil in mapping are small areas of the poorly drained Bonnie and Racoon soils. Bonnie soils are in low areas on flood plains below the Banlic soil. Racoon soils are on terraces above the Banlic soil. Included soils make up 10 to 12 percent of the unit.

Water and air move through the Banlic soil at a slow rate. Surface runoff is slow. The seasonal high water table is perched at a depth of 1 to 3 feet from January through April in most years. Available water capacity is moderate. Organic matter content is low. The shrink-swell potential also is low, and the potential for frost action is high.

Most areas are used for cultivated crops, hay, or pasture. This soil is moderately suited to cultivated crops. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

In the areas used for cultivated crops, the seasonal high water table or the flooding delays planting in most years. The wetness can be reduced by surface ditches and land smoothing. The flooding occurs during the growing season less than once in two years. Dikes and diversions minimize the crop damage caused by floodwater. Tilling when the soil is wet causes surface cloddiness and compaction. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

The land capability classification is IIIw.

7108—Bonnie silt loam, rarely flooded. This nearly level, poorly drained soil is in broad, low areas on flood plains. It is protected by levees and is subject to rare flooding. Individual areas are irregular in shape and range from 5 to about 300 acres in size.

Typically, the surface layer is dark grayish brown, mottled, friable silt loam about 7 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable silt loam. Some areas have strata of silty clay loam in the lower part.

Included with this soil in mapping are small areas of the somewhat poorly drained Belknap and poorly drained Piopolis soils. Belknap soils are better drained than the Bonnie soil. They are in the higher positions on the flood plains. Piopolis soils contain more clay than the Bonnie soil. They are in the lower landscape positions. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Bonnie soil at a moderately slow rate. Surface runoff is slow to ponded. The seasonal high water table is 0.5 foot above to 1.0 foot below the surface from January through June in most years. Organic matter content is moderately low. Available water capacity is very high. The shrink-swell potential is low, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

Most areas are sufficiently drained for corn and soybeans. Flooding is a hazard, but most areas are protected by levees. Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Wetness can be reduced by surface ditches and land smoothing. Subsurface tile drains help to lower the water table, but they must be closely spaced because of the restricted permeability. Tilling when the soil is wet causes surface cloddiness and compaction. Minimizing tillage and returning crop residue to the soil help to maintain good tilth and increase the rate of water infiltration.

The land capability classification is IIw.

7288—Petrolia silty clay loam, rarely flooded. This nearly level, poorly drained soil is in broad, low areas on flood plains. It is protected by levees and is subject to rare flooding. Individual areas are long or irregularly shaped and range from 5 to 150 acres in size.

Typically, the surface layer is dark grayish brown, friable silty clay loam about 9 inches thick. The underlying material to a depth of 60 inches or more is gray, mottled, firm silty clay loam. In some areas the underlying material is more acid.

Included with this soil in mapping are small areas of the very poorly drained Zipp soils. These soils contain more clay than the Petrolia soil. They are in the lower positions on the landscape. They make up less than 5 percent of the unit.

Water and air move through the Petrolia soil at a moderately slow rate. Surface runoff is slow to ponded. The seasonal high water table is 0.5 foot above to 3.0 feet below the surface from December through May in most years. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding and ponding.

In most areas this soil is sufficiently drained for corn and soybeans. Flooding is a hazard, but most areas are protected by levees. Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Wetness can be reduced by surface ditches and land smoothing. Subsurface tile drains help to lower the water table, but they must be closely spaced because of the restricted permeability. Tilling when the soil is wet causes surface cloddiness and compaction. Minimizing tillage and returning crop residue to the soil help to maintain good tilth and increase the rate of water infiltration.

The land capability classification is IIw.

7420—Piopolis silty clay loam, rarely flooded. This nearly level, poorly drained soil is in broad, low areas on flood plains. It is protected by levees and is subject to rare flooding. Individual areas are irregular in shape and range from 10 to 250 acres in size.

Typically, the surface layer is dark grayish brown, friable silty clay loam about 10 inches thick. The underlying material to a depth of 60 inches or more is gray, grayish brown, and light gray, mottled, firm silty clay loam. In some areas the soil contains more sand.

Water and air move through this soil at a slow rate. Surface runoff is slow to ponded. The seasonal high water table is 0.5 foot above to 3.0 feet below the

surface from December through May in most years. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding and ponding.

In most areas this soil is sufficiently drained for corn and soybeans. Measures that maintain the drainage system are needed. Additional drainage is needed in some areas. Wetness can be reduced by surface ditches and land smoothing. Subsurface tile drains help to lower the water table, but they must be closely spaced because of the restricted permeability. Tilling when the soil is wet causes surface cloddiness and compaction. Minimizing tillage and returning crop residue to the soil help to maintain good tilth and increase the rate of water infiltration.

The land capability classification is IIw.

8382—Belknap silt loam, occasionally flooded. This nearly level, somewhat poorly drained soil is on flood plains. It is occasionally flooded for brief periods from December through March. Individual areas are long and narrow and range from 5 to 200 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is dark grayish brown, mottled, friable silt loam about 12 inches thick. The underlying material to a depth of 60 inches or more is mottled, friable silt loam. It is grayish brown in the upper part and gray in the lower part. In some areas older, buried layers are below a recent surface layer. In other areas the soil has strata of sandier textures.

Included with this soil in mapping are small areas of the poorly drained Bonnie and moderately well drained Sharon soils. Bonnie soils are in old slough channels and in broad, low areas below the Belknap soil. Sharon soils are in the higher positions above the Belknap soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Belknap soil at a moderately slow rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet from January through April in most years. Available water capacity is very high. Organic matter content is moderately low. The shrink-swell potential is low, and the potential for frost action is high.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

In the areas used for corn, soybeans, or small grain, the seasonal high water table or the flooding delays planting in most years. The wetness can be reduced by surface ditches. The flooding occurs only infrequently under normal weather conditions. Tilling when the soil is wet causes surface cloddiness and compaction. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Adapted forage and hay plants grow well on this soil. Overgrazing or grazing when the soil is too wet reduces forage yields and causes surface compaction. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIw.

8787—Banlic silt loam, occasionally flooded. This nearly level, somewhat poorly drained soil is on low stream terraces and flood plains. It is occasionally flooded for brief periods from December through March. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 9 inches thick. The subsurface layer is brown, friable silt loam about 4 inches thick. The subsoil is light brownish gray, mottled silt loam about 37 inches thick. The upper part is friable, and the lower part is firm and slightly brittle. The underlying material to a depth of 60 inches or more is mottled light brownish gray, brown, and yellowish brown, firm silt loam. In some areas the lower part of the subsoil is not brittle. In other areas a seasonal high water table is within a depth of 1 foot.

Included with this soil in mapping are small areas of the poorly drained Bonnie and Racoon soils. Bonnie soils are in low areas on flood plains below the Banlic soil. Racoon soils are on terraces above the Banlic soil. Included soils make up 10 to 12 percent of the unit.

Water and air move through the Banlic soil at a slow rate. Surface runoff is slow. The seasonal high water table is perched at a depth of 1 to 3 feet from January through April in most years. Available water capacity is moderate. Organic matter content is low. The shrink-swell potential also is low, and the potential for frost action is high.

Most areas are used for cultivated crops, hay, or pasture. This soil is moderately suited to cultivated crops, hay, and pasture. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

In the areas used for corn, soybeans, or small grain, the seasonal high water table or the flooding delays planting in most years. The wetness can be reduced by surface ditches and land smoothing. The flooding occurs only infrequently under normal weather conditions. Tilling when the soil is wet causes surface

cloddiness and compaction. Returning crop residue to the soil and minimizing tillage help to maintain good tilth and increase the rate of water infiltration.

Adapted forage and hay plants grow well on this soil. Overgrazing or grazing when the soil is too wet reduces forage yields and causes surface compaction. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIw.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

Nearly 333,600 acres in Wayne County, or nearly 73 percent of the total acreage, meets the requirements for prime farmland. This acreage is throughout the county, but most of it is in associations 1, 2, 3, 5, and 6, which are described under the heading "General Soil Map Units."

The map units in Wayne County that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some soils that have a seasonal high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Natural Resources Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

In 1982, an estimated 330,000 acres in Wayne County was cropland, about 25,000 acres was permanent pasture, and 80,000 acres was woodland. The rest of the acreage was used for roads or was built-up land or other areas.

Most areas in Wayne County that are suitable for row crops are presently being used. The soils in the more sloping uplands have good potential for increased production of hay and pasture. This soil survey can be used as a guide to the latest management techniques that increase food production. It provides the resource data needed for land use planning. Land use planners can use the information in this soil survey as a guide in making decisions that will ensure the orderly growth and development of towns and rural areas.

The main management concerns on the cropland and pasture in Wayne County are erosion, drainage, droughtiness, fertility, and tilth.

Erosion is a major management concern on about 35 percent of the cropland and pasture in Wayne County. Erosion is damaging for many reasons. The productivity of most soils is reduced as the surface layer is eroded away and the subsoil is mixed into the plow layer. Loss of the surface layer is particularly damaging on soils that have layers that restrict the penetration of roots. Such layers include the brittle layers in the lower part of the subsoil in Ava, Grantsburg, and Zanesville soils; the channery layer in Frondorf soils; and the clayey subsoil in Bluford and Wynoose soils.

Erosion can result in the deterioration of tilth in the surface soil and can reduce the rate of water infiltration.

An eroded surface soil tends to become cloddy when tilled because it generally has a higher content of clay than an uneroded surface soil and is low in organic matter content. Preparing a good seedbed is difficult on eroded soils, and germination is poor. These soils tend to puddle after a hard rain and to form a crust as they dry. As a result, the runoff rate is increased.

Erosion on farmland can result in the sedimentation of streams, lakes, rivers, and road ditches. Removing this sediment is expensive. Erosion control helps to prevent this pollution and improves the quality of water for municipal and recreational uses and for fish and wildlife.

A good resource management system maintains or improves natural fertility, removes excess water, controls erosion, and maintains good tilth. An adequate vegetative cover and measures that reduce the length of slopes, such as terraces or diversions, help to control erosion, increase the rate of water infiltration, and reduce the runoff rate. A cropping system that keeps a cover of plants or crop residue on the surface during critical rainfall periods helps to hold soil losses within tolerable limits and maintains the productivity of the soil. Including grasses and legumes in the cropping sequence improves tilth and provides nitrogen for the following crop.

No-till farming helps to control erosion on sloping upland soils. On the gently sloping and nearly level Ava, Bluford, and Hoyleton soils, a conservation tillage system or a cropping system that provides an adequate plant cover helps to control erosion. These conservation systems help to prevent excessive soil loss by providing a protective cover of crop residue or plants, reducing the runoff rate, and increasing the rate of water infiltration. They are suitable on most of the tillable upland soils in the county.

Additional information about measures that control erosion on specific soils is provided in the "Technical Guide," which is available in the local office of the Natural Resources Conservation Service.

Artificial drainage is needed on nearly 260,000 acres in Wayne County. Some type of drainage system has been installed in most of these areas. Productivity can be increased if the drainage system is improved. Poorly drained upland soils, such as Cisne, Racoon, and Wynoose soils, are so wet that fieldwork is delayed in most years. Even the somewhat poorly drained soils, such as Belknap and Bluford soils, are wet enough in some years that a drainage system is needed for timely tillage and improved yields. In the more rolling areas of Ava, Blair, and Zanesville soils, hillside seepage can occur. The seeps are normally small. They can hinder fieldwork but do not significantly affect total production. In areas of poorly drained soils on bottom land, both artificial drainage and protection from flooding are needed.

The design of surface and subsurface drainage systems varies with the kind of soil. Tile drains alone are inadequate in most areas. A combination of surface ditches and tile drains is needed in some areas, and open ditches are suitable in other areas. In some areas tile lines should be relatively closely spaced because the water moves so slowly through the soil. In most areas that are drained by tile, the lines can be spaced 50 to 70 feet apart.

Planting row crops on ridges is a popular practice on both clayey and silty soils on bottom land. Ridging helps to remove water from the seedbed, improves seedling emergence, and helps the plants to survive shallow flooding or ponding. Ridging poorly drained soils promotes early warming and drying of the seedbed. Land leveling and a good surface drainage system that provides outlets for individual ridges improve the effectiveness of ridging.

Surface drainage systems, including ditches and land leveling, commonly help to drain excess water in areas of slowly permeable and very slowly permeable soils. Special care is needed to ensure that the ditches are protected against silt deposition and bank erosion.

Additional information about the drainage system suitable for each kind of soil is provided in the "Technical Guide," which is available in the local office of the Natural Resources Conservation Service.

Droughtiness limits the productivity of some of the soils used for crops and pasture in the county. Ava, Zanesville, and other soils having layers that cannot be easily penetrated by plant roots dry out quickly. Moisture stress is soon evident under hot, dry conditions. Measures that improve tilth and reduce the runoff rate and the evaporation rate help to overcome the adverse effects of droughtiness. A system of conservation tillage increases the infiltration rate and reduces the runoff rate. Crop residue management reduces the evaporation rate, improves tilth, and increases the infiltration rate. Deferring tillage when the soils are wet helps to maintain good tilth.

Soil fertility is naturally low or medium in most upland soils. It is more variable in the soils on flood plains. Belknap, Bonnie, and Piopolis soils commonly are extremely acid to strongly acid, but Patton, Petrolia, and Zipp soils commonly are medium acid to mildly alkaline. The surface layer is less acid in areas where lime has been applied. In areas of acid soils, applications of agricultural limestone are needed to maintain or raise the pH level.

Except for Patton soils, which have a dark surface layer, most of the soils in the county have a naturally low or moderate supply of nitrogen. Most crops,

particularly corn, wheat, and grain sorghum, respond well to applications of nitrogen fertilizer. Adding livestock waste and planting inoculated legumes help to replenish the nitrogen supply.

Except for the finer textured soils on bottom land, such as Zipp soils, most of the soils in the county have a low supply of potassium. All of the soils have a naturally low supply of phosphorus.

Additions of lime, phosphorus, potassium, or any of the other elements should be based on the results of soil tests. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime that should be applied.

Soil tilth is an important factor affecting the germination of seeds, the runoff rate, and the rate of water infiltration. Soils that are granular and porous have good tilth. Cropped soils in the uplands commonly have a surface layer of silt loam that is light in color, is low in organic matter content, and has weak structure. In these areas the exposed surface commonly puddles during intense periods of rainfall and forms a crust as the soil dries. When such a crust forms, the rate of water infiltration decreases and the runoff rate increases. Including grasses and legumes in the cropping sequence, regularly returning crop residue to the soil, and adding manure or other organic material improve tilth and help to prevent crusting.

Poor tilth is a problem in the more clayey soils on bottom land, such as Cape and Zipp soils. These soils often stay wet until late in the spring. If plowed when too wet, they tend to become very cloddy. As a result of the cloddiness, preparing a good seedbed is difficult. Chisel plowing these soils in the fall generally results in good tilth in the spring. Leaving crop residue on the surface helps to control soil blowing.

The main field crops grown in the county are corn and soybeans. Wheat is the main small grain crop. Oats, rye, and barley are grown in a few areas, but the acreage used for these crops has been decreasing for the past several years. Grasses and legumes are grown for both hay and pasture. The well drained and moderately well drained soils are suited to alfalfa, orchardgrass, and bromegrass. The wetter soils are suited to alsike clover, ladino clover, timothy, and reed canarygrass. The climate and the soils are suited to the production of orchard fruits, berries, and vegetables.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents *(3)*. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management *(7)*. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and

narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol,* a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X,* stoniness or rockiness; *W,* excess water in or on the soil; *T,* toxic substances in the soil; *D,* restricted rooting depth; *C,* clay in the upper part of the soil; *S,* sandy texture; *F,* a high content of rock fragments in the soil; and *N,* snowpack. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, F, and N.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions.

The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

Wayne County has several areas of scenic and geologic interest. These areas are used for camping, hiking, or picnicking. Public lands are available for recreational uses and for fishing and hunting. One privately owned area provides opportunities for fishing and camping. Several landowners have developed small recreational areas for private use. The Sam Dale Lake Conservation Area provides opportunities for camping, fishing, and hunting. The Little Wabash and Skillet Fork Rivers have good potential for fishing and for development as canoeing streams. The soils best suited for recreational uses are in associations 2, 4, and 7, which are described under the heading "General Soil Map Units."

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also

important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Wayne County has a large and varied population of fish and wildlife. White-tailed deer, squirrels, raccoons, woodpeckers, and various songbirds inhabit the wooded areas. Quail, mourning dove, cottontail rabbit, red fox, coyote, and various songbirds inhabit farmed areas and areas overgrown with grasses, forbs, and shrubs.

The streams, lakes, and ponds are inhabited by largemouth bass, bluegill, crappie, catfish, sunfish, frogs, turtles, muskrats, and several birds and animals that normally live in or near the water. Some of the lakes and ponds also provide resting and feeding areas for migratory ducks and geese in the spring and fall.

In most areas in the county, the wildlife habitat can be improved by providing the food, cover, and water that the wildlife need to survive. Wildlife plantings along field borders increase the amount of food and cover. Constructed ponds provide a dependable water supply in many areas, especially in associations 2 and 4 where natural water supplies often are unavailable during summer and fall.

The removal of trees has greatly reduced the extent of the habitat for woodland wildlife, such as white-tailed deer, raccoons, and squirrels. If this trend continues, the population of some of these species will be reduced unless alternative habitat is provided.

Additional information about wildlife management is available at the local office of the Natural Resources Conservation Service.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining

the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, sorghum, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are sloughs, marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils

and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally

limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-

water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability in the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 18.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-

weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated content of clay in each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6

percent. *Very high*, more than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in table 17, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Illinois Department of Transportation.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); and Moisture density—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(8)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning stratified horizonation, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, soil reaction, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, acid, mesic Typic Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the underlying material can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(9)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(8)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Atlas Series

The Atlas series consists of somewhat poorly drained, very slowly permeable soils on side slopes in the uplands. These soils formed in glacial till or accretion gley that contains a strongly developed

paleosol. Slopes range from 5 to 10 percent.

Typical pedon of Atlas silty clay loam, 5 to 10 percent slopes, severely eroded, 2,040 feet east and 1,640 feet north of the southwest corner of sec. 32, T. 2 N., R. 5 E.

Ap—0 to 3 inches; mixed dark brown (10YR 4/3) and yellowish brown (10YR 5/4) silty clay loam, pale brown (10YR 6/3) and very pale brown (10YR 7/4) dry; weak fine subangular blocky structure; firm; few very fine roots; slightly acid; abrupt smooth boundary.

Btg1—3 to 16 inches; light brownish gray (10YR 6/2) clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate fine prismatic structure; firm; few very fine roots; many distinct grayish brown (10YR 5/2) clay films on faces of peds; common fine rounded concretions of iron and manganese oxide; few pebbles; very strongly acid; clear smooth boundary.

Btg2—16 to 24 inches; light brownish gray (10YR 6/2) clay loam; many coarse prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure; firm; very few very fine roots; common distinct gray (10YR 5/1) clay films on faces of peds; common fine rounded concretions of iron and manganese oxide; few pebbles; strongly acid; clear smooth boundary.

Btg3—24 to 45 inches; light gray (5Y 6/1) clay loam; many coarse prominent yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure; firm; common distinct gray (10YR 5/1) clay films on faces of peds; common fine rounded concretions of iron and manganese oxide; common pebbles; neutral; gradual smooth boundary.

Btg4—45 to 60 inches; mottled yellowish brown (10YR 5/8) and light gray (5Y 6/1) clay loam; weak medium prismatic structure; firm; common distinct light brownish gray (10YR 6/2) clay films on faces of peds; common fine rounded concretions of iron and manganese oxide; common pebbles; neutral.

The thickness of the solum ranges from 42 to more than 60 inches. The content of clay averages 35 to 45 percent in the control section.

The Ap horizon has chroma of 2 to 4. The Btg horizon has hue of 10YR, 2.5Y, or 5Y and value of 4 to 6. It is silty clay loam or clay loam.

Ava Series

The Ava series consists of moderately well drained soils on ridges and side slopes in the uplands. These soils formed in loess and in the underlying silty and loamy sediments at the surface of Illinoian till. Permeability is moderate in the upper part and very slow in the lower part. Slopes range from 2 to 10 percent.

Typical pedon of Ava silt loam, 2 to 5 percent slopes, 575 feet west and 535 feet north of the center of sec. 16, T. 1 N., R. 8 E.

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; common very fine roots; slightly acid; abrupt smooth boundary.

E—8 to 13 inches; yellowish brown (10YR 5/6) silt loam; weak medium platy structure; friable; few very fine roots; strongly acid; clear smooth boundary.

Bt—13 to 20 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium and fine subangular blocky structure; firm; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films and few distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; very strongly acid; clear smooth boundary.

Bt/E—20 to 25 inches; yellowish brown (10YR 5/4) silty clay loam (Bt) and light brownish gray (10YR 6/2) silt loam (E); the E material occurs as coatings on faces of peds; moderate medium and fine subangular blocky structure; firm; few very fine roots; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common medium irregular stains of iron and manganese oxide; very strongly acid; clear smooth boundary.

B't—25 to 35 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium angular blocky structure; firm; few very fine roots; many distinct dark brown (10YR 4/3) and common distinct grayish brown (10YR 5/2) clay films on faces of peds; common distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

2Btx1—35 to 40 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure; firm; slightly brittle; few very fine roots between peds; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine rounded concretions of iron and manganese oxide; about 1 percent pebbles; about 15 percent fine sand; very strongly acid; clear smooth boundary.

2Btx2—40 to 49 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure; firm; slightly brittle; few very fine roots between peds; few distinct dark yellowish brown

(10YR 4/4) clay films and few distinct light gray (10YR 7/2) silt coatings on faces of peds; common fine rounded concretions of iron and manganese oxide; about 1 percent pebbles; about 15 percent fine sand; very strongly acid; gradual smooth boundary.

2BC—49 to 60 inches; yellowish brown (10YR 5/6) silty clay loam; common fine distinct light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; firm; few fine rounded concretions of iron and manganese oxide; about 1 percent pebbles; about 15 percent fine sand; very strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The thickness of the loess typically ranges from 30 to 55 inches. Depth to the fragipan typically ranges from 25 to 40 inches. In areas that are severely eroded, the loess is as thin as 13 inches and the fragipan is at a depth as shallow as 13 inches. The content of clay averages 24 to 35 percent in the control section.

The Ap horizon has value of 4 or 5 and chroma of 2 to 4. The E horizon, if it occurs, has value of 4 or 5 and chroma of 3 to 6. The Bt and B′t horizons have hue of 10YR or 7.5YR and value and chroma of 4 to 6. They are silty clay loam or silt loam. The 2Btx horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6. It is silty clay loam, silt loam, or loam.

Ava silty clay loam, 5 to 10 percent slopes, severely eroded, has a thinner loess cap because of erosion and has more sand in the control section than is defined as the range for the series. These differences, however, do not significantly affect the use or behavior of the soil.

Banlic Series

The Banlic series consists of somewhat poorly drained, slowly permeable soils on low stream terraces and flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Banlic silt loam, occasionally flooded, 250 feet west and 460 feet south of the northeast corner of sec. 9, T. 2 S., R. 8 E.

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak very fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

E—9 to 13 inches; brown (10YR 5/3) silt loam; weak fine subangular blocky structure; friable; few fine roots; common distinct dark grayish brown (10YR 4/2) organic coatings and common distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bg1—13 to 21 inches; light brownish gray (10YR 6/2) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium and coarse subangular blocky structure; friable; few fine roots; few distinct grayish brown (10YR 5/2) organic coatings and many distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; strongly acid; gradual smooth boundary.

Bg2—21 to 30 inches; light brownish gray (10YR 6/2) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; very few fine roots; many distinct light gray (10YR 7/2) silt coatings on faces of peds; common fine and medium rounded concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bxg1—30 to 39 inches; light brownish gray (10YR 6/2) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; slightly brittle; few fine roots between peds; many distinct light gray (10YR 7/2) silt coatings on faces of peds; common fine and medium rounded concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bxg2—39 to 50 inches; light brownish gray (10YR 6/2) silt loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; slightly brittle; few fine roots between peds; common distinct light gray (10YR 7/2) silt coatings on faces of peds; many fine and medium rounded concretions of iron and manganese oxide; strongly acid; gradual smooth boundary.

Cg—50 to 60 inches; mottled light brownish gray (10YR 6/2), brown (10YR 5/3), and yellowish brown (10YR 5/6) silt loam; massive; firm; many fine rounded concretions of iron and manganese oxide; medium acid.

The thickness of the solum ranges from 45 to more than 60 inches. Depth to the Bxg horizon ranges from 20 to 36 inches. The content of clay averages 12 to 18 percent in the control section.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The E and Bg horizons have value of 5 or 6 and chroma of 2 or 3. The Bxg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 4. The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4.

Belknap Series

The Belknap series consists of somewhat poorly drained, moderately slowly permeable soils on flood plains. These soils formed in acid, silty alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Belknap silt loam, frequently flooded, 180 feet east and 100 feet south of the northwest corner of sec. 22, T. 1 S., R. 7 E.

Ap—0 to 10 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

ACg—10 to 18 inches; dark brown (10YR 4/3) silt loam; few fine and medium faint grayish brown (10YR 5/2) mottles; massive; friable; few very fine and fine roots; common faint dark grayish brown (10YR 4/2) organic coatings in root channels; few fine irregular stains of iron and manganese oxide; strongly acid; clear smooth boundary.

Cg1—18 to 28 inches; light brownish gray (10YR 6/2) silt loam; common coarse faint brown (10YR 5/3) and distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine roots; few distinct dark brown (10YR 4/3) organic coatings and few distinct light gray (10YR 7/1) silt coatings in pores; common fine irregular stains of iron and manganese oxide; strongly acid; clear smooth boundary.

Cg2—28 to 50 inches; light brownish gray (10YR 6/2) silt loam; many coarse faint brown (10YR 5/3) and light gray (10YR 7/1) mottles; massive; friable; few fine roots; common medium irregular stains of iron and manganese oxide; very strongly acid; gradual smooth boundary.

Cg3—50 to 60 inches; grayish brown (10YR 5/2) silt loam; many medium faint light gray (10YR 7/1) mottles; massive; friable; very strongly acid.

The content of clay averages less than 18 percent in the control section. The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The ACg horizon, if it occurs, has colors similar to those of the Ap horizon. The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4.

Blair Series

The Blair series consists of somewhat poorly drained, moderately slowly permeable soils on side slopes in the uplands. These soils formed in silty and loamy sediments and in the underlying glacial till that contains a strongly developed paleosol, or they formed entirely in silty and loamy sediments. Slopes range from 5 to 10 percent.

The Blair soils in this county have more sand in the control section than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Typical pedon of Blair silt loam, 5 to 10 percent slopes, severely eroded, 1,250 feet west and 300 feet north of the southeast corner of sec. 10, T. 1 N., R. 7 E.

Ap—0 to 6 inches; mixed dark brown (10YR 4/3) and yellowish brown (10YR 5/4) silt loam, pale brown (10YR 6/3) and brownish yellow (10YR 6/6) dry; weak fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

Bt1—6 to 10 inches; yellowish brown (10YR 5/4) clay loam; common fine prominent strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; friable; common fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; about 1 percent pebbles; strongly acid; clear smooth boundary.

Bt2—10 to 19 inches; yellowish brown (10YR 5/4) clay loam; common fine distinct light brownish gray (10YR 6/2) and common medium prominent strong brown (7.5YR 5/8) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common medium irregular stains and few coarse rounded concretions of iron and manganese oxide; about 1 percent pebbles; very strongly acid; clear smooth boundary.

Btg1—19 to 28 inches; light brownish gray (10YR 6/2) clay loam; common fine prominent strong brown (7.5YR 5/8) and common medium distinct yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots between peds; many prominent dark grayish brown (2.5Y 4/2) clay films on faces of peds; about 1 percent pebbles; very strongly acid; clear smooth boundary.

Btg2—28 to 36 inches; light brownish gray (10YR 6/2) clay loam; common medium prominent strong brown (7.5YR 5/8) and common medium distinct yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; few very fine roots between peds; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common medium irregular stains of iron and manganese oxide; about 1 percent pebbles; slightly acid; clear smooth boundary.

2Btg3—36 to 44 inches; light gray (10YR 6/1) clay loam; common medium prominent strong brown (7.5YR 5/8) and common medium distinct yellowish brown (10YR 5/4) mottles; moderate medium

prismatic structure; firm; many distinct grayish brown (10YR 5/2) clay films on faces of peds; about 1 percent pebbles; neutral; gradual smooth boundary.

2Btg4—44 to 60 inches; mottled light gray (10YR 6/1) and yellowish brown (10YR 5/8) clay loam; weak medium prismatic structure; firm; common distinct grayish brown (10YR 5/2) clay films on faces of peds; common medium irregular stains of iron and manganese oxide; about 1 percent pebbles; neutral.

The thickness of the solum ranges from 50 to more than 60 inches. The content of clay averages 25 to 35 percent in the control section.

The Ap horizon has chroma of 2 to 4. It is silt loam, loam, or silty clay loam. The Bt horizon has value of 4 to 6 and chroma of 3 to 6. The Btg horizon has value of 4 to 6. The Bt and Btg horizons are clay loam, loam, silty clay loam, or silt loam.

Bluford Series

The Bluford series consists of somewhat poorly drained, slowly permeable soils on broad ridges and side slopes in the uplands. These soils formed in loess and in the underlying silty sediments at the surface of Illinoian till. Slopes range from 0 to 5 percent.

Typical pedon of Bluford silt loam, 0 to 2 percent slopes, 760 feet west and 140 feet north of the center of sec. 24, T. 1 N., R. 6 E.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; many fine roots; few fine rounded concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

E—10 to 18 inches; pale brown (10YR 6/3) silt loam; common medium faint light gray (10YR 7/2) mottles; weak medium platy structure; friable; few faint brown (10YR 5/3) organic coatings on faces of peds; few medium rounded concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Btg1—18 to 24 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common distinct grayish brown (10YR 5/2) clay films and many distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; very strongly acid; abrupt smooth boundary.

Btg2—24 to 36 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate coarse subangular blocky structure; firm; many faint grayish brown (10YR 5/2) clay films on faces of peds; common fine rounded concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

2Btxg1—36 to 52 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak coarse subangular blocky; firm; brittle; common distinct grayish brown (10YR 5/2) clay films on faces of peds; common fine rounded concretions of iron and manganese oxide; about 10 percent sand; very strongly acid; gradual smooth boundary.

2Btxg2—52 to 60 inches; light brownish gray (10YR 6/2) silty clay loam; common coarse distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; brittle; few distinct grayish brown (10YR 5/2) clay films on faces of peds; common medium irregular stains of iron and manganese oxide; about 20 percent sand; medium acid.

The thickness of the solum ranges from 50 to more than 60 inches. The thickness of the loess ranges from 30 to 45 inches. The content of clay averages 35 to 42 percent in the control section.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The E horizon, if it occurs, has value of 4 to 6 and chroma of 2 to 4. The Bt or Btg horizon has value of 5 or 6 and chroma of 2 to 6. The 2Btxg horizon has value of 5 or 6 and chroma of 2 to 6. It is silty clay loam or silt loam.

Bonnie Series

The Bonnie series consists of poorly drained and very poorly drained, moderately slowly permeable soils in sloughs and in broad, low areas on flood plains. These soils formed in acid, silty alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Bonnie silt loam, frequently flooded, 290 feet east and 770 feet north of the center of sec. 4, T. 1 S., R. 5 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; common fine roots; few light brownish gray (10YR 6/2) soil fragments; many fine dark yellowish brown (10YR 3/4) concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

Cg1—8 to 11 inches; light gray (10YR 7/2) silt loam; many coarse distinct yellowish brown (10YR 5/4) and few medium distinct yellowish brown (10YR

5/8) mottles; rock structure of the strata of deposition, but massive within strata; friable but compact as a plowpan; common fine roots; many fine very dark grayish brown (10YR 3/2) and black (10YR 2/1) concretions of iron and manganese oxide; strongly acid; abrupt smooth boundary.

Cg2—11 to 25 inches; light gray (10YR 7/2) silt loam; many coarse distinct brown (10YR 5/3), common medium distinct yellowish brown (10YR 5/6), and common medium prominent brown (7.5YR 4/4) mottles; weak fine granular structure; friable; few fine roots; many fine very dark grayish brown (10YR 3/2) and black (10YR 2/1) concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Cg3—25 to 44 inches; gray (10YR 6/1) and light gray (10YR 7/1) silt loam; many coarse distinct brown (10YR 4/3) and few fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine roots; few thin light gray (10YR 7/2) silt coatings in major cracks; many fine very dark grayish brown (10YR 3/2) and black (10YR 2/1) concretions of iron and manganese oxide; strongly acid; diffuse smooth boundary.

Cg4—44 to 60 inches; gray (5Y 6/1) silty clay loam; many coarse distinct brown (10YR 4/3), common fine prominent yellowish brown (10YR 5/6), and few fine prominent strong brown (7.5YR 5/6) mottles; massive; friable; many fine very dark grayish brown (10YR 3/2) and black (10YR 2/1) concretions of iron and manganese oxide that increase in size with increasing depth; strongly acid.

The content of clay averages 18 to 27 percent in the control section. The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. The Cg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 5 to 7 and chroma of 0 to 2.

Cape Series

The Cape series consists of poorly drained, very slowly permeable soils in broad, low areas on flood plains and lake plains. These soils formed in silty and clayey sediments. Slopes range from 0 to 2 percent.

Typical pedon of Cape silty clay loam, frequently flooded, 600 feet east and 250 feet south of the northwest corner of sec. 27, T. 2 S., R. 7 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; firm; few fine rounded concretions of iron and manganese oxide; slightly acid; abrupt smooth boundary.

Bg1—6 to 13 inches; gray (5Y 5/1) silty clay; common fine prominent strong brown (7.5YR 5/6) mottles; moderate medium angular blocky structure; firm; few fine rounded concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Bg2—13 to 24 inches; gray (5Y 5/1) silty clay; common medium prominent strong brown (7.5YR 5/6) mottles; strong medium and coarse angular blocky structure; firm; common fine rounded concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Bg3—24 to 50 inches; light gray (5Y 6/1) silty clay; common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; many faint gray (5Y 5/1) pressure faces on faces of peds; common fine rounded concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bg4—50 to 60 inches; light gray (5Y 6/1) silty clay; common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium and coarse prismatic structure parting to moderate medium angular blocky; firm; common faint gray (5Y 5/1) pressure faces on faces of peds; common fine rounded concretions of iron and manganese oxide; medium acid.

The thickness of the solum ranges from 35 to 60 inches. The content of clay averages 35 to 45 percent in the control section. The Ap horizon has value of 4 or 5 and chroma of 1 or 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. Some pedons have a Cg horizon. This horizon is silty clay loam or silty clay.

Cisne Series

The Cisne series consists of poorly drained, very slowly permeable soils on broad till plains in the uplands. These soils formed in loess and in the underlying silty sediments at the surface of Illinoian till. Slopes range from 0 to 2 percent.

Typical pedon of Cisne silt loam, 1,400 feet east and 1,000 feet south of the northwest corner of sec. 8, T. 1 S., R. 7 E.

Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam, grayish brown (10YR 5/2) dry; few fine distinct dark yellowish brown (10YR 3/6) mottles; weak fine granular structure; friable; common fine roots; few fine rounded concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

Eg1—9 to 15 inches; light brownish gray (2.5Y 6/2) silt loam; common fine prominent strong brown (7.5YR

5/6) and common fine prominent yellowish brown (10YR 5/4) mottles; weak medium platy structure; friable; common very fine roots; few distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Eg2—15 to 20 inches; light gray (10YR 7/2) silt loam; common fine distinct dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; friable; common very fine roots; few fine rounded concretions of iron and manganese oxide; strongly acid; abrupt smooth boundary.

Btg1—20 to 32 inches; light brownish gray (2.5Y 6/2) silty clay; common medium prominent strong brown (7.5YR 5/6) and common medium prominent yellowish red (5YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few fine roots between peds; many prominent dark gray (10YR 4/1) clay films and few faint light gray (10YR 7/2) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

2Btg2—32 to 45 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent strong brown (7.5YR 5/8) and common medium distinct brown (10YR 5/3) mottles; weak coarse subangular blocky structure; firm; common distinct grayish brown (10YR 5/2) clay films and many distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; about 10 percent fine sand; strongly acid; gradual smooth boundary.

2Btg3—45 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam; many coarse prominent strong brown (7.5YR 4/6) mottles; weak coarse prismatic structure; firm; common distinct gray (10YR 5/1) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; about 15 percent fine sand; strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The thickness of the loess ranges from 30 to 55 inches. The content of clay averages 35 to 45 percent in the control section.

The Ap horizon has chroma of 2 or 3. The Eg horizon has value of 5 to 7 and chroma of 1 or 2. The Btg and 2Btg horizons have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2.

Creal Series

The Creal series consists of somewhat poorly drained, moderately slowly permeable soils on foot slopes and stream terraces. These soils formed in a mixture of loess and silty local alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Creal silt loam, 100 feet west and 400 feet north of the center of sec. 23, T. 2 S., R. 7 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; few very fine roots; medium acid; abrupt smooth boundary.

E—8 to 16 inches; light yellowish brown (10YR 6/4) silt loam; few fine distinct light gray (10YR 7/2) and common fine distinct yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable; few very fine roots; common fine rounded concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Eg1—16 to 24 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct light yellowish brown (10YR 6/4) and common fine prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few very fine roots; common distinct white (10YR 8/2) silt coatings on faces of peds; common medium rounded concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Eg2—24 to 29 inches; light brownish gray (10YR 6/2) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few faint white (10YR 8/2) silt coatings on faces of peds; common fine and medium rounded concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Btg1—29 to 45 inches; light brownish gray (10YR 6/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak medium and coarse subangular blocky structure; firm; common distinct grayish brown (10YR 5/2) clay films and few faint white (10YR 8/2) silt coatings on faces of peds; common medium rounded concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Btg2—45 to 60 inches; light brownish gray (10YR 6/2) silty clay loam; many medium prominent strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; firm; few distinct grayish brown (10YR 5/2) clay films on faces of peds; many medium rounded concretions of iron and manganese oxide; slightly acid.

The thickness of the solum ranges from 45 to more than 60 inches. The content of clay averages 25 to 35 percent in the control section.

The Ap horizon has value of 4 or 5 and chroma of 2

or 3. The E and Eg horizons have value of 5 or 6. The Btg horizon has value of 5 or 6 and chroma of 2 to 4. It is silty clay loam or silt loam.

Evansville Series

The Evansville series consists of poorly drained, moderately permeable soils on low stream terraces and lake plains. These soils formed in silty lacustrine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Evansville silt loam, frequently flooded, 240 feet west and 150 feet south of the center of sec. 10, T. 3 S., R. 9 E.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; common fine and medium roots; neutral; abrupt smooth boundary.

Bg1—10 to 18 inches; gray (10YR 5/1) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate very fine and fine subangular blocky structure; firm; few fine roots; many faint dark gray (10YR 4/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg2—18 to 34 inches; gray (5Y 5/1) silty clay loam; common medium prominent light olive brown (2.5Y 5/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; many faint dark gray (10YR 4/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg3—34 to 42 inches; gray (10YR 5/1) silty clay loam; many coarse prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; firm; few faint grayish brown (10YR 5/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Cg—42 to 60 inches; light gray (10YR 6/1) silt loam; many coarse prominent yellowish brown (10YR 5/6) mottles; massive; friable; neutral.

The thickness of the solum ranges from 40 to 50 inches. The content of clay averages 25 to 35 percent in the control section.

The Ap horizon has hue of 10YR or 2.5Y and value of 4 or 5. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It is silt loam or silty clay loam. The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2.

Frondorf Series

The Frondorf series consists of well drained, moderately permeable soils on side slopes in the uplands. These soils formed in a thin mantle of loess and in the underlying silty and loamy residuum weathered from sandstone, siltstone, and shale. Slopes range from 15 to 30 percent.

Typical pedon of Frondorf silt loam, 15 to 20 percent slopes, 2,310 feet east and 300 feet south of the center of sec. 35, T. 1 S., R. 7 E.

A—0 to 3 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine granular structure; friable; common fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; strongly acid; clear smooth boundary.

E—3 to 6 inches; yellowish brown (10YR 5/4) silt loam; weak thin platy structure; friable; many fine roots; few distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; about 3 percent channers; very strongly acid; clear smooth boundary.

Bt1—6 to 11 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; many fine roots; few faint dark brown (10YR 4/3) clay films on faces of peds; about 3 percent channers; very strongly acid; clear smooth boundary.

2Bt2—11 to 20 inches; yellowish brown (10YR 5/6) channery loam; moderate medium subangular blocky structure; friable; few distinct yellowish brown (10YR 5/4) clay films in root channels; about 15 percent channers; very strongly acid; abrupt smooth boundary.

2BC—20 to 28 inches; mixed yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) channery silty clay loam; weak thick platy structure; friable; few distinct yellowish brown (10YR 5/4) clay films in root channels; about 20 percent channers; very strongly acid; abrupt smooth boundary.

2Cr—28 to 60 inches; mixed yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2), weathered sandstone and shale.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The thickness of the loess ranges from 11 to 24 inches. The control section averages 27 to 35 percent clay and more than 15 percent fine sand or coarser sand.

The A horizon has value of 3 or 4 and chroma of 2 or 3. The E horizon has value of 5 or 6 and chroma of 3 or 4. The 2Bt horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. It is loam, silty clay loam, silt loam, or the channery analogs of those textures. The 2Cr horizon is variable in color and texture because of the variability of the bedrock material.

Geff Series

The Geff series consists of somewhat poorly drained, moderately permeable soils on stream terraces. These

soils formed in loess and in the underlying loamy outwash. Slopes range from 0 to 2 percent.

Typical pedon of Geff silt loam, 1,900 feet east and 60 feet north of the southwest corner of sec. 33, T. 1 S., R. 9 E.

Ap—0 to 10 inches; brown or dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak very fine granular structure; friable; common very fine roots; few fine rounded concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

E—10 to 15 inches; brown (10YR 5/3) silt loam; common fine distinct yellowish brown (10YR 5/6) and common fine distinct light brownish gray (10YR 6/2) mottles; weak thick platy structure parting to weak fine and medium subangular blocky; friable; common very fine roots; common distinct grayish brown (10YR 5/2) organic coatings on faces of peds; common distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bt1—15 to 21 inches; yellowish brown (10YR 5/4) silty clay loam; many fine distinct light brownish gray (10YR 6/2) mottles; moderate fine and medium subangular blocky structure; friable; common very fine roots; many distinct brown (10YR 5/3) clay films on faces of peds; few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Bt2—21 to 35 inches; light brownish gray (10YR 6/2) silty clay loam; many medium distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; common very fine roots; many distinct brown (10YR 5/3) clay films and common distinct light gray (10YR 7/2) silt coatings on faces of peds; common fine rounded concretions of iron and manganese oxide; very strongly acid; clear wavy boundary.

2Bt3—35 to 49 inches; mottled yellowish brown (10YR 5/4 and 5/8) and light brownish gray (10YR 6/2) silt loam; moderate medium prismatic structure; friable; very few fine roots; common distinct brown (10YR 5/3) clay films on faces of peds; common fine rounded concretions of iron and manganese oxide; 15 to 30 percent sand; content of sand increases with increasing depth; medium acid; clear smooth boundary.

2Bt4—49 to 60 inches; yellowish brown (10YR 5/6), stratified loam and sandy loam; few fine distinct light brownish gray (10YR 6/2) and few fine faint yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure; friable; few very fine roots; few distinct yellowish brown (10YR 5/4) clay films on faces of peds; slightly acid.

The thickness of the solum ranges from 50 to more than 60 inches. The thickness of the loess ranges from 24 to 40 inches. The content of clay averages 27 to 35 percent in the control section. The content of coarse fragments averages less than 10 percent in the control section.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The Bt and 2Bt horizons have value of 4 to 6.

Grantsburg Series

The Grantsburg series consists of moderately well drained soils on ridges and knolls in the uplands. Permeability is moderate in the upper part and very slow in the lower part. These soils formed in loess and in the underlying silty sediments. Interbedded sandstone, siltstone, and shale is at a depth of 5 to 10 feet. Slopes range from 2 to 5 percent.

Typical pedon of Grantsburg silt loam, 2 to 5 percent slopes, 50 feet west and 400 feet south of the northeast corner of sec. 13, T. 3 S., R. 8 E.

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; common fine roots; slightly acid; abrupt smooth boundary.

E—8 to 12 inches; yellowish brown (10YR 5/4) silt loam; weak thin platy structure; friable; common fine roots; strongly acid; clear smooth boundary.

Bt—12 to 23 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; common faint strong brown (7.5YR 5/6) clay films and few distinct light yellowish brown (10YR 6/4) silt coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt/E—23 to 36 inches; yellowish brown (10YR 5/4) silty clay loam (Bt) and light gray (10YR 7/2) silt loam (E); the E material occurs as common distinct coatings on faces of peds; few fine distinct light brownish gray (10YR 6/2) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; many distinct brown (10YR 5/3) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

B′t—36 to 44 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak medium prismatic

structure parting to weak coarse subangular blocky; friable; common distinct brown (10YR 5/3) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

2Btx1—44 to 57 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak medium prismatic structure; firm; slightly brittle; few faint yellowish brown (10YR 5/4) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; strongly acid; gradual smooth boundary.

2Btx2—57 to 65 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct yellowish brown (10YR 5/8) and common medium distinct pale brown (10YR 6/3) mottles; weak medium prismatic structure; firm; slightly brittle; few faint yellowish brown (10YR 5/4) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; about 5 percent channers; strongly acid.

The thickness of the solum ranges from 50 to more than 60 inches. Depth to the fragipan ranges from 24 to 44 inches. The underlying silty sediments contain about 10 percent sand. The content of clay averages 25 to 35 percent in the control section.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The E horizon has value of 5 or 6 and chroma of 3 or 4. The Bt and B′t horizons have hue of 10YR or 7.5YR and value of 5 or 6. The 2Btx horizon has hue of 10YR or 7.5YR and chroma of 4 to 6. It is silt loam or silty clay loam.

Henshaw Series

The Henshaw series consists of somewhat poorly drained, moderately slowly permeable soils on low stream terraces. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Henshaw silt loam, frequently flooded, 1,680 feet east and 85 feet north of the southwest corner of sec. 34, T. 2 S., R. 9 E.

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam, light yellowish brown (10YR 6/4) dry; weak fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

Bt1—8 to 16 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct yellowish brown (10YR 5/8) and few medium distinct light brownish gray (10YR 6/2) mottles; weak fine and medium subangular blocky structure; firm; many fine roots; few faint grayish brown (10YR 5/2) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—16 to 28 inches; pale brown (10YR 6/3) silty clay loam; common medium faint light brownish gray (10YR 6/2) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm; common fine roots; common faint grayish brown (10YR 5/2) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—28 to 42 inches; pale brown (10YR 6/3) silty clay loam; common medium faint light brownish gray (10YR 6/2) and many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; common faint grayish brown (10YR 5/2) clay films on faces of peds; common fine and medium rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

Btg—42 to 50 inches; light brownish gray (10YR 6/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) and common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium prismatic structure; firm; few faint grayish brown (10YR 5/2) clay films on faces of peds; common fine and medium rounded concretions of iron and manganese oxide; slightly acid; gradual wavy boundary.

2Cg—50 to 60 inches; light brownish gray (10YR 6/2), stratified silt loam and loam; many medium distinct yellowish brown (10YR 5/6) mottles; massive; firm; neutral.

The thickness of the solum ranges from 40 to 60 inches. The content of clay averages 25 to 35 percent in the control section.

The Ap horizon has value of 4 or 5 and chroma of 2 to 4. The Bt horizon has value of 4 to 6 and chroma of 3 to 6. It is silt loam or silty clay loam. The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is silt loam or silty clay loam. The Cg horizon has the same range in colors as the Btg horizon. It is commonly silt loam or silty clay loam and has stratified layers of loam or clay loam.

Hickory Series

The Hickory series consists of well drained and moderately well drained, moderately permeable soils on side slopes in the uplands. These soils formed in glacial till. Slopes range from 10 to 30 percent.

Typical pedon of Hickory loam, 15 to 20 percent slopes, 660 feet east and 200 feet north of the southwest corner of sec. 9, T. 1 N., R. 8 E.

Ap—0 to 5 inches; dark brown (10YR 4/3) loam, pale brown (10YR 6/3) dry; weak medium granular structure; friable; many fine roots; about 2 percent pebbles; slightly acid; clear smooth boundary.

E—5 to 9 inches; strong brown (7.5YR 5/6) loam; weak fine subangular blocky structure; friable; common fine roots; common distinct dark brown (10YR 4/3) organic coatings in pores; about 2 percent pebbles; slightly acid; clear smooth boundary.

Bt1—9 to 15 inches; strong brown (7.5YR 5/6) loam; few fine prominent light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few very fine roots; many distinct strong brown (7.5YR 4/6) clay films on faces of peds; about 5 percent pebbles; medium acid; gradual smooth boundary.

Bt2—15 to 26 inches; strong brown (7.5YR 5/6) clay loam; few fine prominent light yellowish brown (10YR 6/4) mottles; moderate medium and coarse subangular blocky structure; firm; few very fine roots; many distinct reddish brown (5YR 4/4) clay films on faces of peds; common medium irregular stains of iron and manganese oxide; about 5 percent pebbles; medium acid; gradual smooth boundary.

Bt3—26 to 37 inches; strong brown (7.5YR 5/6) clay loam; few fine prominent light yellowish brown (10YR 6/4) mottles; weak medium and coarse subangular blocky structure; firm; few very fine roots; many distinct brown (7.5YR 5/4) clay films on faces of peds; common medium irregular stains and common fine rounded concretions of iron and manganese oxide; about 11 percent pebbles; very strongly acid; gradual smooth boundary.

Bt4—37 to 51 inches; yellowish brown (10YR 5/6) loam; few medium distinct light gray (10YR 7/2) and common coarse prominent strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; firm; many distinct brown (7.5YR 5/4) clay films on faces of peds; common medium irregular stains and common fine rounded concretions of iron and manganese oxide; about 12 percent pebbles; very strongly acid; gradual smooth boundary.

Bt5—51 to 60 inches; yellowish brown (10YR 5/6) loam; common medium distinct light brownish gray (10YR 6/2) and common medium prominent strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure; firm; common distinct brown (7.5YR 5/4) clay films on faces of peds; common medium irregular stains and common fine rounded concretions of iron and manganese oxide; about 14 percent pebbles; neutral.

The thickness of the solum is more than 60 inches. The control section averages 27 to 35 percent clay and 15 to 45 percent fine sand or coarser sand.

The Ap horizon has value of 4 or 5 and chroma of 2 to 4. It is loam, silt loam, clay loam, or silty clay loam. The E horizon, if it occurs, has value of 4 to 6. It is loam or silt loam. The Bt horizon has value of 5 or 6 and chroma of 4 to 6. It is loam, clay loam, silty clay loam, or the gravelly analogs of those textures.

Hoyleton Series

The Hoyleton series consists of somewhat poorly drained, slowly permeable soils on ridges and knolls in the uplands. These soils formed in loess and in the underlying silty and loamy sediments at the surface of Illinoian till. Slopes range from 0 to 5 percent.

Typical pedon of Hoyleton silt loam, 0 to 2 percent slopes, 610 feet west and 150 feet north of the southeast corner of sec. 12, T. 1 N., R. 8 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

BE—9 to 13 inches; brown (10YR 5/3) silt loam; few fine prominent strong brown (7.5YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; few very fine roots; common distinct dark grayish brown (10YR 4/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bt1—13 to 19 inches; light yellowish brown (10YR 6/4) silty clay loam; many medium prominent yellowish red (5YR 4/6) mottles; moderate fine and medium subangular blocky structure; firm; few very fine roots; few distinct brown (10YR 5/3) and few distinct grayish brown (10YR 5/2) clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—19 to 28 inches; brown (10YR 5/3) silty clay loam; many medium prominent red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; many distinct grayish brown (10YR 5/2) clay films and many distinct light gray (10YR 7/2) silt coatings on faces of peds; very strongly acid; clear smooth boundary.

Bt3—28 to 34 inches; light yellowish brown (10YR 6/4) silty clay loam; common coarse prominent strong brown (7.5YR 5/6) and common medium distinct brownish yellow (10YR 6/6) mottles; moderate medium prismatic structure; firm; few very fine roots; many distinct dark grayish brown (10YR 4/2) and common distinct light brownish gray (10YR 6/2) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt4—34 to 42 inches; yellowish brown (10YR 5/4) silt loam; common medium faint light yellowish brown

(10YR 6/4) and common medium prominent strong brown (7.5YR 5/6) mottles; weak medium prismatic structure; firm; very few very fine roots; few distinct gray (10YR 5/1) clay films and few distinct light gray (10YR 7/2) silt coatings on faces of peds; strongly acid; gradual smooth boundary.

2Bt5—42 to 60 inches; pale brown (10YR 6/3) loam; many coarse prominent strong brown (7.5YR 5/6) mottles; weak medium prismatic structure; friable; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid.

The thickness of the solum is typically more than 60 inches. The thickness of the loess ranges from 30 to 50 percent. The content of clay averages 35 to 45 percent in the control section.

The Ap horizon has chroma of 2 or 3. Some pedons have an E or a BE horizon. These horizons have value of 5 or 6 and chroma of 3 or 4. The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. The 2Bt horizon is loam, silt loam, or silty clay loam.

Negley Series

The Negley series consists of well drained, moderately rapidly permeable soils on side slopes on outwash plains. These soils formed in loamy outwash. Slopes range from 10 to 45 percent.

Typical pedon of Negley loam, 20 to 45 percent slopes, 520 feet east and 1,900 feet north of the southwest corner of sec. 8, T. 3 S., R. 9 E.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few very fine roots; neutral; clear smooth boundary.

E—2 to 8 inches; brown (10YR 5/3) loam; weak fine subangular blocky structure; friable; few very fine roots; common faint pale brown (10YR 6/3) silt coatings and common distinct dark brown (10YR 4/3) organic coatings on faces of peds; about 2 percent pebbles; strongly acid; clear smooth boundary.

BE—8 to 14 inches; brown (7.5YR 4/4) loam; moderate fine subangular blocky structure; friable; few very fine roots; few distinct dark brown (10YR 4/3) organic coatings on faces of peds; about 3 percent pebbles; medium acid; clear smooth boundary.

Bt1—14 to 29 inches; strong brown (7.5YR 4/6) loam; weak medium subangular blocky structure; friable; few very fine roots; common prominent white (10YR 8/2) sand coatings and common distinct yellowish red (5YR 4/6) clay films on faces of peds; about 5 percent pebbles; medium acid; gradual smooth boundary.

Bt2—29 to 38 inches; strong brown (7.5YR 4/6) sandy loam; moderate fine prismatic structure; friable; common prominent white (10YR 8/2) sand coatings and common distinct yellowish red (5YR 4/6) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; about 5 percent pebbles; strongly acid; gradual smooth boundary.

Bt3—38 to 60 inches; strong brown (7.5YR 4/6) gravelly sandy loam; weak medium prismatic structure; friable; common distinct yellowish red (5YR 4/6) clay films on faces of peds; about 25 percent pebbles; strongly acid.

The thickness of the solum is more than 60 inches. Some pedons have a loess cap as much as 18 inches thick. The content of clay averages 18 to 35 percent in the control section.

The Ap horizon has value of 3 to 5 and chroma of 2 to 4. It is loam or silt loam. The E horizon has value of 5 or 6 and chroma of 3 to 5. It is silt loam or loam. Some pedons do not have an E horizon. The Bt horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 3 to 8. It is loam, sandy loam, sandy clay loam, or the gravelly analogs of those textures.

Parke Series

The Parke series consists of well drained, moderately permeable soils on narrow ridges and side slopes on outwash plains. These soils formed in loess and in the underlying loamy outwash. Slopes range from 2 to 10 percent.

Typical pedon of Parke silt loam, 2 to 5 percent slopes, 2,100 feet east and 85 feet north of the center of sec. 5, T. 3 S., R. 9 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; common very fine roots; medium acid; abrupt smooth boundary.

Bt1—7 to 12 inches; yellowish brown (10YR 5/6) silt loam; moderate fine subangular blocky structure; friable; common very fine roots; many distinct brown (7.5YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—12 to 19 inches; strong brown (7.5YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; firm; few very fine roots; many distinct brown (7.5YR 4/4) clay films on faces of peds; very few fine rounded accumulations of iron and manganese oxide; medium acid; clear smooth boundary.

Bt3—19 to 38 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium prismatic structure parting to moderate coarse subangular blocky; firm;

few very fine roots; many distinct brown (7.5YR 4/4) clay films on faces of peds; very strongly acid; clear smooth boundary.

2Bt4—38 to 54 inches; strong brown (7.5YR 5/6) loam; moderate medium prismatic structure parting to moderate coarse subangular blocky; friable; many distinct reddish brown (5YR 4/4) clay films on faces of peds; about 3 percent gravel; very strongly acid; gradual smooth boundary.

2Bt5—54 to 68 inches; yellowish red (5YR 5/6) loam; weak coarse prismatic structure; friable; common distinct reddish brown (5YR 4/4) clay films on faces of peds; about 3 percent gravel; very strongly acid.

The thickness of the solum is more than 60 inches. The thickness of the loess ranges from 20 to 40 inches. The content of clay averages 18 to 35 percent in the control section.

The Ap horizon has value of 4 or 5 and chroma of 2 to 6. The Bt horizon has value of 4 or 5 and chroma of 4 to 6. The 2Bt horizon has hue of 7.5YR, 5YR, or 2.5YR, value of 3 to 5, and chroma of 3 to 6. It is sandy clay loam, clay loam, or loam.

Patton Series

The Patton series consists of poorly drained soils in broad, low areas and in sloughs on low stream terraces and lake plains. Permeability is moderate in the upper part and moderately slow in the lower part. These soils formed in silty and loamy lacustrine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Patton silty clay loam, frequently flooded, 1,140 feet west and 2,260 feet north of the southeast corner of sec. 4, T. 2 S., R. 9 E.

Ap—0 to 11 inches; very dark brown (10YR 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; common very fine roots; few fine rounded concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

Bg—11 to 18 inches; dark gray (5Y 4/1) silty clay loam; common fine prominent yellowish brown (10YR 5/4) mottles; moderate fine prismatic structure parting to moderate fine and medium angular blocky; firm; few very fine roots; many prominent black (10YR 2/1) organic coatings on faces of peds; common fine rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

Btg1—18 to 33 inches; olive gray (5Y 4/2) silty clay loam; common fine prominent yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few very fine roots; many prominent very dark gray (10YR 3/1) organic coatings and many distinct dark gray (10YR 4/1) clay films on faces of peds; common fine rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

Btg2—33 to 44 inches; mottled light gray (10YR 6/1), olive (5Y 5/4), and yellowish brown (10YR 5/6) silty clay loam; moderate medium prismatic structure; firm; few very fine roots; many distinct gray (10YR 5/1) and common distinct dark gray (10YR 4/1) clay films on faces of peds; common medium rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

BCg—44 to 50 inches; light gray (5Y 6/1), stratified silt loam and loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; few very fine roots; common distinct gray (10YR 5/1) clay films on vertical faces of peds; common medium rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

Cg—50 to 60 inches; light gray (5Y 6/1), stratified silt loam and loam; common prominent yellowish brown (10YR 5/4) mottles; massive; firm; common medium rounded iron and manganese concretions; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 45 to 50 inches. The mollic epipedon includes the upper part of the B horizon in some pedons. The content of clay averages 27 to 35 percent in the control section.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Bg, Btg, BCg, and Cg horizons have hue of 10YR, 2.5Y, or 5Y or are neutral in hue. They have chroma of 0 to 2.

Petrolia Series

The Petrolia series consists of poorly drained, moderately slowly permeable soils in broad, low areas on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Petrolia silty clay loam, frequently flooded, 1,660 feet west and 1,700 feet south of the northeast corner of sec. 29, T. 2 N., R. 9 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; weak medium granular structure; firm; few very fine roots; neutral; abrupt smooth boundary.

Cg1—6 to 17 inches; gray (10YR 5/1) silty clay loam; common fine prominent strong brown (7.5YR 4/6 and 5/6) mottles; weak coarse subangular blocky structure; firm; few very fine roots; few fine rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

Cg2—17 to 30 inches; light gray (10YR 6/1) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; firm; few fine rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

Cg3—30 to 39 inches; gray (10YR 5/1) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; firm; common fine rounded concretions of iron and manganese oxide; neutral; gradual smooth boundary.

Cg4—39 to 60 inches; gray (10YR 5/1) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; firm; many fine rounded concretions of iron and manganese oxide; neutral.

The content of clay averages 27 to 35 percent in the control section.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. The Cg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2.

Piopolis Series

The Piopolis series consists of poorly drained, slowly permeable soils in broad, low areas on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Piopolis silty clay loam, frequently flooded, 1,920 feet east and 300 feet south of the northwest corner of sec. 25, T. 2 S., R. 6 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; many fine prominent strong brown (7.5YR 5/8) and few medium distinct light brownish gray (10YR 6/2) mottles; weak medium granular structure; friable; few fine roots; few fine rounded concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

Cg1—7 to 14 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent strong brown (7.5YR 5/8) and few medium prominent yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; firm; few fine roots; few faint gray (10YR 5/1) organic coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Cg2—14 to 38 inches; light brownish gray (10YR 6/2) silty clay loam; many medium prominent strong brown (7.5YR 5/6) and few fine prominent yellowish red (5YR 5/6) mottles; weak coarse subangular blocky structure; firm; few very fine roots; very strongly acid; gradual smooth boundary.

Cg3—38 to 60 inches; light brownish gray (10YR 6/2) silty clay loam; many medium prominent strong brown (7.5YR 5/6) and common fine prominent reddish brown (5YR 5/4) mottles; massive; firm; very strongly acid.

The content of clay averages 27 to 35 percent in the control section.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. Some pedons have strata of silt loam or silty clay below a depth of 40 inches.

Racoon Series

The Racoon series consists of poorly drained, slowly permeable soils on stream terraces and on foot slopes and in small depressions in the uplands. These soils formed in a mixture of loess and silty local alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Racoon silt loam, 485 feet east and 430 feet south of the center of sec. 10, T. 2 S., R. 6 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; common fine faint grayish brown (10YR 5/2) mottles; weak fine granular structure; friable; few very fine roots; few fine rounded concretions of iron and manganese oxide; slightly acid; abrupt smooth boundary.

Eg1—8 to 17 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/4) and common fine prominent strong brown (7.5YR 5/6) mottles; weak medium platy structure; friable; common very fine roots; common faint grayish brown (10YR 5/2) organic coatings on faces of peds; common fine rounded concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Eg2—17 to 27 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium and coarse subangular blocky structure; friable; common very fine roots; common distinct light gray (10YR 7/2) silt coatings on faces of peds; common fine rounded concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg/Eg—27 to 34 inches; light brownish gray (10YR 6/2) silty clay loam (Btg) and light gray (10YR 7/2) silt loam (Eg); the E material occurs as many prominent coatings on faces of peds; common medium distinct

yellowish brown (10YR 5/4) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; common very fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; common fine rounded concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg1—34 to 44 inches; light brownish gray (10YR 6/2) silty clay loam; common fine distinct yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; many distinct grayish brown (10YR 5/2) clay films on faces of peds and common distinct dark gray (10YR 4/1) clay films in root channels; many coarse irregular stains and common medium rounded concretions of iron and manganese oxide; very strongly acid; gradual smooth boundary.

Btg2—44 to 60 inches; light brownish gray (10YR 6/2) silty clay loam; many fine prominent strong brown (7.5YR 5/6) and many fine distinct yellowish brown (10YR 5/4) mottles; weak medium prismatic structure; firm; few faint grayish brown (10YR 5/2) clay films on faces of peds; many coarse irregular stains and common medium rounded concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

BCg—60 to 68 inches; mottled light brownish gray (10YR 6/2) and strong brown (7.5YR 5/8) silt loam; weak medium prismatic structure; friable; few coarse irregular stains and common fine rounded concretions of iron and manganese oxide; strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. Depth to the Btg horizon ranges from 24 to 36 inches. The content of clay averages 27 to 35 percent in the control section.

The Ap horizon has value of 4 to 6. The Eg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 to 7, and chroma of 1 or 2. The BCg horizon is silt loam or silty clay loam.

Ridgway Series

The Ridgway series consists of well drained soils on crests and side slopes on stream terraces. These soils formed in loess and in the underlying loamy and sandy outwash. Permeability is moderate in the upper part and rapid in the lower part. Slopes range from 2 to 5 percent.

Typical pedon of Ridgway silt loam, 2 to 5 percent slopes, 1,500 feet south of the northeast corner of sec. 29, T. 1 S., R. 9 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; few very fine roots; slightly acid; abrupt smooth boundary.

Bt1—7 to 12 inches; yellowish brown (10YR 5/4) silt loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; many distinct dark brown (10YR 4/3) organic coatings and common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—12 to 20 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine and medium angular blocky structure; friable; few very fine roots; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—20 to 29 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium and coarse angular blocky structure; firm; few very fine roots; many distinct dark yellowish brown (10YR 4/4) clay films and common prominent light gray (10YR 7/2) silt coatings on faces of peds; strongly acid; clear smooth boundary.

2Bt4—29 to 36 inches; yellowish brown (10YR 5/6) fine sandy loam; moderate medium prismatic structure; friable; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; gradual smooth boundary.

2BC—36 to 52 inches; mixed yellowish brown (10YR 5/6) and brown (7.5YR 4/4) fine sandy loam that has few thin strata of loam and loamy fine sand; weak coarse prismatic structure; friable; strongly acid; gradual smooth boundary.

2C—52 to 60 inches; stratified yellowish brown (10YR 5/6) loamy fine sand and strong brown (7.5YR 5/6) fine sandy loam; massive; friable; strongly acid.

The thickness of the solum ranges from 50 to more than 60 inches. The thickness of the loess ranges from 24 to 40 inches. The content of clay averages 27 to 35 percent in the control section.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. The 2Bt, 2BC, and 2C horizons have value of 4 to 6 and chroma of 3 to 6.

Sexton Series

The Sexton series consists of poorly drained, slowly permeable soils on low stream terraces. These soils formed in loess and in the underlying loamy and silty lacustrine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Sexton silt loam, frequently flooded,

175 feet east and 1,975 feet north of the southwest corner of sec. 16, T. 2 S., R. 9 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; weak medium granular structure; friable; few fine roots; few fine rounded concretions of iron and manganese oxide; slightly acid; abrupt smooth boundary.

Eg—7 to 12 inches; light gray (10YR 7/2) silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak thin platy structure; friable; few fine roots; common fine rounded concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg1—12 to 15 inches; light gray (10YR 6/1) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few distinct grayish brown (10YR 5/2) clay films on faces of peds; common fine rounded concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg2—15 to 25 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky; firm; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; very strongly acid; gradual smooth boundary.

Btg3—25 to 35 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; strongly acid; gradual smooth boundary.

Btg4—35 to 48 inches; light brownish gray (10YR 6/2) silty clay; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; firm; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; slightly acid; gradual smooth boundary.

Btg5—48 to 57 inches; light gray (10YR 6/1) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; firm; few distinct gray (10YR 5/1) and grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; neutral; clear smooth boundary.

2BCg—57 to 65 inches; mixed light gray (10YR 6/1) and yellowish brown (10YR 5/6), stratified very fine sandy loam and loam; massive; friable; mildly alkaline.

The thickness of the solum ranges from 36 to more than 60 inches. The thickness of the loess ranges from 40 to 60 inches. The content of clay averages 35 to 42 percent in the control section.

The Ap horizon has value of 4 to 6. The Eg horizon has value of 6 or 7. The Btg horizon has hue of 10YR or 2.5Y and value of 4 to 6. The 2BCg horizon is commonly stratified silt loam, loam, very fine sandy loam, and silty clay loam. In some pedons it contains thin strata of sand.

Sharon Series

The Sharon series consists of moderately well drained, moderately permeable soils on narrow flood plains or on natural levees along the major streams. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Sharon silt loam, frequently flooded, 600 feet west and 160 feet north of the southeast corner of sec. 20, T. 2 S., R. 6 E.

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak medium granular structure; friable; few very fine roots; slightly acid; abrupt smooth boundary.

A—8 to 14 inches; yellowish brown (10YR 5/4) silt loam; weak fine and medium subangular blocky structure; friable; common distinct dark brown (10YR 4/3) organic coatings on faces of peds and few distinct light brownish gray (10YR 6/2) silt coatings in root channels; strongly acid; clear smooth boundary.

C1—14 to 25 inches; yellowish brown (10YR 5/4) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; common distinct dark yellowish brown (10YR 4/4) organic coatings on faces of peds and few distinct light gray (10YR 7/2) silt coatings in root channels; very strongly acid; gradual smooth boundary.

C2—25 to 34 inches; yellowish brown (10YR 5/4) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; common distinct light gray (10YR 7/2) silt coatings in root channels; few fine rounded concretions of iron and manganese oxide; very strongly acid; gradual smooth boundary.

C3—34 to 60 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct light brownish gray (10YR 6/2) and common fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine rounded concretions of iron and manganese oxide; very strongly acid.

The control section averages less than 18 percent clay and less than 15 percent fine sand or coarser sand.

The C horizon has value of 4 to 6 and chroma of 3 to 6. In some pedons it has thin strata of loam, sandy loam, loamy sand, or sand.

Uniontown Series

The Uniontown series consists of moderately well drained, moderately permeable soils on side slopes on low stream terraces. These soils formed in silty alluvium. Slopes range from 4 to 10 percent.

Typical pedon of Uniontown silt loam, frequently flooded, 4 to 10 percent slopes, eroded, 440 feet west and 2,240 feet north of the center of sec. 13, T. 3 S., R. 9 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam, light yellowish brown (10YR 6/4) dry; weak fine granular structure; friable; many very fine roots; slightly acid; abrupt smooth boundary.

Bt1—7 to 18 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; common very fine roots; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—18 to 30 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots and very few coarse roots; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds and few distinct pale brown (10YR 6/3) silt coatings on vertical faces of peds; few fine rounded concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt3—30 to 40 inches; yellowish brown (10YR 5/6) silt loam; few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common distinct pale brown (10YR 6/3) silt coatings on vertical faces of peds and few distinct dark brown (10YR 4/3) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

BCg—40 to 54 inches; light brownish gray (10YR 6/2) silty clay loam; many coarse prominent yellowish brown (10YR 5/8) mottles; weak medium prismatic structure; friable; few distinct pale brown (10YR 6/3) silt coatings on vertical faces of peds; few fine rounded concretions of iron and manganese oxide; neutral; gradual wavy boundary.

Cg—54 to 60 inches; light brownish gray (10YR 6/2), stratified silt loam and silty clay loam; many coarse prominent yellowish brown (10YR 5/8) mottles; massive; friable; neutral.

The thickness of the solum ranges from 30 to 55 inches. The content of clay averages 20 to 35 percent in the control section.

The Ap horizon has value of 4 or 5 and chroma of 2 to 4. It is silt loam or silty clay loam. The Bt horizon has value of 4 or 5 and chroma of 4 to 6. The BCg and Cg horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 8.

Wynoose Series

The Wynoose series consists of poorly drained, very slowly permeable soils on broad till plains in the uplands. These soils formed in loess and in the underlying silty sediments at the surface of Illinoian till. Slopes range from 0 to 2 percent.

Typical pedon of Wynoose silt loam, 1,650 feet east and 130 feet south of the center of sec. 10, T. 1 N., R. 8 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; common fine prominent brown (7.5YR 4/4) mottles; weak fine granular structure; friable; common very fine roots; common fine rounded concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

Eg1—7 to 14 inches; light brownish gray (10YR 6/2) silt loam; common fine prominent strong brown (7.5YR 5/6) and common fine distinct yellowish brown (10YR 5/6) mottles; weak medium platy structure; friable; few very fine roots; few distinct dark grayish brown (10YR 4/2) organic coatings and common prominent light gray (10YR 7/2) silt coatings on faces of peds; common fine rounded concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

Eg2—14 to 20 inches; light brownish gray (10YR 6/2) silt loam; many fine prominent strong brown (7.5YR 5/6) mottles; weak medium platy structure; friable; few very fine roots; common distinct grayish brown (10YR 5/2) organic coatings on faces of peds; few medium irregular stains and common fine rounded concretions of iron and manganese oxide; very strongly acid; abrupt smooth boundary.

Btg1—20 to 29 inches; light brownish gray (10YR 6/2) silty clay; common fine and medium prominent strong brown (7.5YR 5/6) mottles; moderate fine prismatic structure parting to moderate medium angular blocky; firm; few very fine roots between peds; many distinct gray (10YR 5/1) clay films and many distinct light gray (10YR 7/2) silt coatings on faces of peds; common fine rounded concretions of

iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg2—29 to 36 inches; light brownish gray (10YR 6/2) silty clay; many medium prominent strong brown (7.5YR 5/6) mottles; weak fine and medium prismatic structure; firm; few very fine roots between peds; common distinct gray (10YR 5/1) clay films on faces of peds; common medium irregular stains and common fine rounded concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

2Btg3—36 to 60 inches; light brownish gray (10YR 6/2) silty clay loam; many medium prominent strong brown (7.5YR 5/6) mottles; weak medium prismatic structure; firm; few very fine roots between peds; few distinct grayish brown (10YR 5/2) clay films on faces of peds and few distinct dark gray (10YR 4/1) clay films in root channels; few fine rounded concretions of iron and manganese oxide; about 2 percent pebbles; about 12 percent sand; strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The thickness of the loess ranges from 30 to 55 inches. The content of clay averages 35 to 42 percent in the control section.

The Ap horizon has value of 4 to 6 and chroma of 1 or 2. The Eg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. The Btg and 2Btg horizons have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. The 2Btg horizon is silty clay loam or silt loam.

Zanesville Series

The Zanesville series consists of moderately well drained soils on side slopes in the uplands. These soils formed in loess and in the underlying silty sediments and loamy material weathered from sandstone, siltstone, and shale. Permeability is moderate in the upper part and slow in the lower part. Slopes range from 5 to 15 percent.

Typical pedon of Zanesville silt loam, 5 to 10 percent slopes, severely eroded, 2,080 feet north of the center of sec. 35, T. 1 S., R. 7 E.

Ap—0 to 4 inches; mixed dark brown (10YR 4/3) and yellowish brown (10YR 5/6) silt loam, pale brown (10YR 6/3) and brownish yellow (10YR 6/6) dry; weak medium granular structure; friable; many fine roots; few fine rounded concretions of iron and manganese oxide; medium acid; clear smooth boundary.

Bt—4 to 12 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; common distinct brown (10YR 5/3) clay films and common distinct dark brown (7.5YR 4/2) organic coatings on faces of peds; few fine rounded concretions of iron and manganese oxide; very strongly acid; clear smooth boundary.

2Btx1—12 to 27 inches; yellowish brown (10YR 5/6) silty clay loam; moderate coarse prismatic structure; firm; slightly brittle; few fine roots between peds; common distinct dark yellowish brown (10YR 4/4) and grayish brown (10YR 5/2) clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; about 1 percent pebbles; very strongly acid; clear smooth boundary.

2Btx2—27 to 37 inches; yellowish brown (10YR 5/6) silty clay loam; common medium prominent brown (7.5YR 5/4) and common medium distinct pale brown (10YR 6/3) mottles; moderate coarse prismatic structure; firm; slightly brittle; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few medium irregular stains and few fine rounded concretions of iron and manganese oxide; about 2 percent pebbles; strongly acid; clear smooth boundary.

2Btx3—37 to 47 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct strong brown (7.5YR 5/6) and common medium distinct grayish brown (10YR 5/2) mottles; moderate coarse prismatic structure; firm; slightly brittle; common distinct brown (7.5YR 4/4) clay films on faces of peds; few medium irregular stains and few fine rounded concretions of iron and manganese oxide; about 3 percent pebbles; medium acid; clear smooth boundary.

3BC—47 to 60 inches; yellowish brown (10YR 5/8) loam; common medium distinct reddish yellow (7.5YR 6/8) and common fine prominent grayish brown (10YR 5/2) mottles; weak thick platy structure; firm; few distinct brown (7.5YR 4/4) and strong brown (7.5YR 5/6) clay films on faces of peds; few medium irregular stains of iron and manganese oxide; about 10 percent channers; slightly acid.

The thickness of the solum ranges from 35 to more than 60 inches. The depth to bedrock ranges from 40 to 80 inches. Depth to the fragipan typically ranges from 20 to 32 inches, but in severely eroded areas it is as shallow as 12 inches. The thickness of the loess typically ranges from 24 to 48 inches, but the loess is at a depth as shallow as 12 inches in severely eroded areas. The content of clay averages 25 to 35 percent in the control section.

The Ap horizon has value of 3 to 5 and chroma of 2

to 4. The Bt, Btx, and 2Btx horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The 2Btx horizon is silty clay loam, silt loam, or clay loam.

Zipp Series

The Zipp series consists of very poorly drained, slowly permeable soils in sloughs and in broad, low areas on flood plains and lake plains. These soils formed in clayey lacustrine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Zipp silty clay, frequently flooded, 1,330 feet west and 1,000 feet south of the center of sec. 34, T. 2 S., R. 7 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silty clay, light brownish gray (10YR 6/2) dry; few fine prominent yellowish brown (10YR 5/8) mottles; weak fine and medium subangular blocky structure; firm; few very fine roots; neutral; abrupt smooth boundary.

Bg1—8 to 15 inches; dark gray (10YR 4/1) silty clay; common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium and fine subangular blocky structure; firm; few very fine roots; many faint dark gray (2.5Y 4/0) pressure faces on faces of peds; few fine rounded concretions of iron and manganese oxide; slightly acid; gradual smooth boundary.

Bg2—15 to 23 inches; dark gray (10YR 4/1) silty clay; common medium prominent strong brown (7.5YR 5/6) mottles; weak medium angular blocky structure; firm; few very fine roots; many faint dark gray (2.5Y 4/0) pressure faces on faces of peds; few fine rounded concretions of iron and manganese oxide; neutral; gradual smooth boundary.

Bg3—23 to 46 inches; gray (10YR 5/1) silty clay; common fine prominent yellowish brown (10YR 5/8) mottles; moderate medium angular blocky structure; firm; few very fine roots; many faint dark gray (2.5Y 4/0) pressure faces on faces of peds; common fine rounded concretions of iron and manganese oxide; neutral; gradual smooth boundary.

Bg4—46 to 60 inches; gray (10YR 5/1) silty clay; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium and fine angular blocky structure; firm; few fine rounded concretions of iron and manganese oxide; mildly alkaline.

The thickness of the solum ranges from 30 to 60 inches. The content of clay averages 40 to 55 percent in the control section.

The Ap horizon has chroma of 1 or 2. It is silty clay or silty clay loam. Some pedons have silt loam overwash about 9 inches thick. The Bg horizon has hue of 10YR or 2.5Y and value of 4 to 6. It is typically silty clay, but in some pedons it has subhorizons of silty clay loam.

Formation of the Soils

Soils form through processes that act on deposited or accumulated geologic materials. The characteristics of a soil at any given point are determined by the physical and mineralogical composition of the parent material; the plant and animal life on and in the soil; the relief, or lay of the land; the climate under which the soil material accumulated and has existed since accumulation; and the length of time that the forces of soil formation have acted on the soil material *(5)*.

Parent Material

Parent material is the unconsolidated material in which a soil forms. It determines the mineralogical and chemical composition of the soil. To a large extent, parent material also determines the rate at which soil formation takes place. The soils in Wayne County formed in loess, alluvium, lacustrine sediments, glacial till, and material weathered from bedrock.

Loess, or wind-deposited material, is the most extensive parent material in the county. It blankets many of the other kinds of parent materials. Peoria Loess was deposited during the Woodfordian Substage of the Wisconsinan Stage, about 22,000 to 12,500 years ago *(10)*. Underlying the Peoria Loess are silty and loamy sediments. These sediments consist of reworked material from the surface of the Illinoian till and early Wisconsinan loess. The early Wisconsinan loess is Roxana Silt. Roxana Silt was deposited more than 28,000 years ago, during the Altonian Substage. In some areas the sediments consist entirely of Roxana Silt. The Roxana Silt is generally thinner than the Peoria Loess and commonly contains more sand. It has had a greater influence on modern soils in areas where it is closer to the surface and the layer of Peoria Loess is thinner. Ava and Bluford soils are examples of soils that formed in Peoria Loess and in the underlying sediments.

Soils on flood plains formed in alluvium, which is material deposited by water. Many of these soils still receive sediments. Belknap and Sharon soils formed in silty alluvium.

Lacustrine sediments were deposited by water along the Wabash River and its tributaries following periods of major glaciation. The Wabash River was blocked, forming a slack-water lake *(4)*. The deposition from the lake generally ranges from 20 to 40 feet in thickness. These sediments are commonly clayey near the surface, but the texture varies, depending on the speed of the water at the time of deposition. Zipp soils formed in clayey lacustrine sediments in slack-water areas of former glacial lakes.

Glacial till is material laid down directly by glaciers with a limited amount of water action. It is a mixture of soil particles and rock fragments of different sizes. In Wayne County, the till was deposited during the Illinoian glacial period. The glacial till is generally thin and discontinuous. In some areas the Sangamon soil, a paleosol, is in the surface layer of the Illinoian till *(10)*. Soils that formed in glacial till are on side slopes above drainageways. Atlas and Hickory soils are examples.

Some of the soils in the survey area formed in material weathered from sandstone, siltstone, and shale bedrock. Frondorf soils, for example, formed in loess and in the underlying sandstone and shale residuum.

Plant and Animal Life

Living organisms, such as plants, animals, bacteria, and fungi, have important effects on soil formation. Burrowing animals, for example, help to keep the soil open and porous. Bacteria and fungi aid in the decomposition of plant and animal remains. Vegetation strongly influences the content of organic matter, the color of the surface layer, and the level of fertility of the soil. Most of the soils in Wayne County formed under forest vegetation and have a light-colored surface layer. Ava and Grantsburg soils are examples. Some soils formed under grasses. These soils have a darker surface layer that contains more organic matter than that of soils that formed under woodland vegetation. Hoyleton and Patton soils are examples of soils that formed under grasses.

Human activities can affect soil formation. Farming can reduce the content of organic matter in the surface soil and increase the rate of runoff and the susceptibility to erosion. Building levees can reduce the frequency of flooding and prevent the deposition of soil material.

Storing oil waste products in pits and drilling for oil may release salts or chemicals that are toxic to plants and animals.

Relief

Many differences among the soils in the county are the result of relief. Slope affects drainage, runoff, erosion, and deposition. Slopes differ in gradient, length, shape, and exposure. Some or all of these slope characteristics are responsible for the differences among soils that formed in the same kinds of parent material, such as Ava, Bluford, and Wynoose soils. Soils that formed in different kinds of parent material but are in areas with similar topography commonly have similar natural drainage characteristics. Examples are the well drained Frondorf and Hickory soils.

As the slope gradient increases, the runoff rate and the susceptibility to erosion increase, especially if the soils are cultivated. Erosion constantly changes the characteristics of soils. The differences between the characteristics of the severely eroded Ava soils and those of the Ava soils that are not eroded are examples of this process.

A greater amount of clay accumulates in the subsoil of nearly level soils on uplands than in the subsoil of other upland soils. The nearly level soils transmit more water than the other soils and are wetter. The nearly level, poorly drained Wynoose soils have a high content of clay in the subsoil because of this soil-forming process.

Climate

Climate affects the kinds of plants on and in the soil and helps to determine the rate of weathering. The humid, temperate climate of Wayne County has favored the rapid weathering of soil material, the formation of clay, and the downward movement of material from the surface layer to the subsoil. Most upland soils in the county have more clay in the subsoil than in the surface layer.

Time

Time affects the degree of profile development in a soil. The influence of time, however, can be modified by the deposition of material, relief, and the kind of parent material. Soils with little or no profile development are considered immature. Soils having well expressed horizons are considered mature. Belknap and Sharon soils on flood plains are examples of immature soils. They still accumulate deposits during periods of flooding and have only very weakly expressed horizons. The parent material of Banlic soils is similar to that of Belknap and Sharon soils. The new sediments are deposited slowly enough, however, for more pronounced profile development than is evident in the Belknap and Sharon soils.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of clay.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural

class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth to bedrock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a

short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then

deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the

acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons,

and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range in moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediments of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). A layer of otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most

favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1961-90 at Fairfield, Illinois)

Month	Temperature: Average daily maximum	Temperature: Average daily minimum	Temperature: Average	Temperature: 2 years in 10 will have-- Maximum temperature higher than--	Temperature: 2 years in 10 will have-- Minimum temperature lower than--	Temperature: Average number of growing degree days*	Precipitation: Average	Precipitation: 2 years in 10 will have-- Less than--	Precipitation: 2 years in 10 will have-- More than--	Precipitation: Average number of days with 0.10 inch or more	Precipitation: Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	38.0	20.3	29.2	67	-12	4	2.30	0.98	3.42	4	3.9
February----	42.9	24.1	33.5	72	-6	11	2.73	1.38	3.91	5	3.9
March-------	54.9	34.6	44.8	81	9	72	4.78	2.79	6.55	8	2.1
April-------	66.7	44.1	55.4	86	24	217	4.51	2.62	6.19	8	.2
May---------	76.3	53.1	64.7	91	33	459	4.92	2.82	6.79	7	.0
June--------	85.0	61.6	73.3	96	44	698	3.93	2.27	5.41	6	.0
July--------	88.2	65.5	76.9	99	50	832	4.16	2.30	5.81	6	.0
August------	86.4	63.2	74.8	99	48	769	3.25	1.77	4.55	5	.0
September---	80.5	56.6	68.5	95	35	556	3.12	1.57	4.47	5	.0
October-----	68.9	45.0	57.0	88	24	248	3.30	1.78	4.85	5	.0
November----	55.0	36.0	45.5	77	13	66	3.93	2.26	5.66	6	.6
December----	42.3	25.6	33.9	67	-3	13	3.79	1.91	5.43	6	2.7
Yearly:											
Average---	65.4	44.1	54.8	---	---	---	---	---	---	---	---
Extreme---	108	-23	---	100	-14	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,944	44.73	38.09	51.12	71	13.4

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1961-90 at Fairfield, Illinois)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 10	Apr. 15	May 3
2 years in 10 later than--	Apr. 4	Apr. 11	Apr. 27
5 years in 10 later than--	Mar. 24	Apr. 1	Apr. 17
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 25	Oct. 14	Sept. 28
2 years in 10 earlier than--	Oct. 30	Oct. 19	Oct. 3
5 years in 10 earlier than--	Nov. 9	Oct. 28	Oct. 13

TABLE 3.--GROWING SEASON

(Recorded in the period 1961-90 at Fairfield, Illinois)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	193	186	156
8 years in 10	200	191	164
5 years in 10	213	202	178
2 years in 10	227	212	192
1 year in 10	234	218	200

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
2	Cisne silt loam	7,970	1.7
3A	Hoyleton silt loam, 0 to 2 percent slopes	5,530	1.2
3B	Hoyleton silt loam, 2 to 5 percent slopes	2,180	0.5
5C2	Blair silt loam, 5 to 10 percent slopes, eroded	6,250	1.4
5C3	Blair silt loam, 5 to 10 percent slopes, severely eroded	14,970	3.3
7C3	Atlas silty clay loam, 5 to 10 percent slopes, severely eroded	990	0.2
8D2	Hickory silt loam, 10 to 15 percent slopes, eroded	1,770	0.4
8D3	Hickory silt loam, 10 to 15 percent slopes, severely eroded	4,440	1.0
8E	Hickory loam, 15 to 20 percent slopes	2,300	0.5
8E3	Hickory clay loam, 15 to 20 percent slopes, severely eroded	1,640	0.4
8F	Hickory loam, 20 to 30 percent slopes	2,670	0.6
12	Wynoose silt loam	38,200	8.2
13A	Bluford silt loam, 0 to 2 percent slopes	65,780	14.4
13B	Bluford silt loam, 2 to 5 percent slopes	41,750	9.1
13B2	Bluford silt loam, 2 to 5 percent slopes, eroded	34,970	7.6
14B	Ava silt loam, 2 to 5 percent slopes	22,970	5.0
14B2	Ava silt loam, 2 to 5 percent slopes, eroded	4,000	0.9
14C2	Ava silt loam, 5 to 10 percent slopes, eroded	6,010	1.3
14C3	Ava silty clay loam, 5 to 10 percent slopes, severely eroded	9,820	2.1
15B	Parke silt loam, 2 to 5 percent slopes	890	0.2
15C2	Parke silt loam, 5 to 10 percent slopes, eroded	2,330	0.5
109	Racoon silt loam	12,230	2.7
301B	Grantsburg silt loam, 2 to 5 percent slopes	2,600	0.6
337	Creal silt loam	3,440	0.8
340C3	Zanesville silt loam, 5 to 10 percent slopes, severely eroded	9,250	2.0
340D2	Zanesville silt loam, 10 to 15 percent slopes, eroded	1,240	0.3
340D3	Zanesville silt loam, 10 to 15 percent slopes, severely eroded	2,180	0.5
432	Geff silt loam	480	0.1
434B	Ridgway silt loam, 2 to 5 percent slopes	510	0.1
585D3	Negley silt loam, 10 to 15 percent slopes, severely eroded	310	0.1
585F	Negley loam, 20 to 45 percent slopes	920	0.2
786E	Frondorf silt loam, 15 to 20 percent slopes	1,920	0.4
786F	Frondorf silt loam, 20 to 30 percent slopes	1,250	0.3
1108	Bonnie silt loam, wet	920	0.2
1524	Zipp silty clay loam, wet	220	*
3072	Sharon silt loam, frequently flooded	830	0.2
3108	Bonnie silt loam, frequently flooded	66,560	14.5
3142	Patton silty clay loam, frequently flooded	2,220	0.5
3208	Sexton silt loam, frequently flooded	3,400	0.7
3231	Evansville silt loam, frequently flooded	2,000	0.4
3288	Petrolia silty clay loam, frequently flooded	3,200	0.7
3382	Belknap silt loam, frequently flooded	9,420	2.1
3420	Piopolis silty clay loam, frequently flooded	10,200	2.2
3422	Cape silty clay loam, frequently flooded	1,450	0.3
3482C	Uniontown silt loam, frequently flooded, 4 to 10 percent slopes, eroded	310	0.1
3483	Henshaw silt loam, frequently flooded	2,130	0.5
3524	Zipp silty clay, frequently flooded	5,220	1.1
3524+	Zipp silt loam, overwash, frequently flooded	850	0.2
3787	Banlic silt loam, frequently flooded	4,930	1.1
7108	Bonnie silt loam, rarely flooded	4,580	1.0
7288	Petrolia silty clay loam, rarely flooded	2,320	0.5
7420	Piopolis silty clay loam, rarely flooded	1,320	0.3
8382	Belknap silt loam, occasionally flooded	13,650	3.0
8787	Banlic silt loam, occasionally flooded	5,980	1.3
	Water	2,310	0.5
	Total	457,780	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
2	Cisne silt loam (where drained)
3A	Hoyleton silt loam, 0 to 2 percent slopes
3B	Hoyleton silt loam, 2 to 5 percent slopes
13A	Bluford silt loam, 0 to 2 percent slopes (where drained)
13B	Bluford silt loam, 2 to 5 percent slopes
13B2	Bluford silt loam, 2 to 5 percent slopes, eroded
14B	Ava silt loam, 2 to 5 percent slopes
14B2	Ava silt loam, 2 to 5 percent slopes, eroded
15B	Parke silt loam, 2 to 5 percent slopes
109	Racoon silt loam (where drained)
301B	Grantsburg silt loam, 2 to 5 percent slopes
337	Creal silt loam (where drained)
432	Geff silt loam
434B	Ridgway silt loam, 2 to 5 percent slopes
3072	Sharon silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3108	Bonnie silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3142	Patton silty clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3208	Sexton silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3231	Evansville silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3288	Petrolia silty clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3382	Belknap silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3420	Piopolis silty clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3422	Cape silty clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3483	Henshaw silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3524	Zipp silty clay, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3524+	Zipp silt loam, overwash, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3787	Banlic silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
7108	Bonnie silt loam, rarely flooded (where drained)
7288	Petrolia silty clay loam, rarely flooded (where drained)
7420	Piopolis silty clay loam, rarely flooded (where drained)
8382	Belknap silt loam, occasionally flooded (where drained)
8787	Banlic silt loam, occasionally flooded (where drained)

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
2 Cisne	IIIw	115	35	52	---	4.5	---
3A Hoyleton	IIw	116	34	53	---	4.7	7.5
3B Hoyleton	IIe	115	34	52	---	4.7	7.4
5C2 Blair	IIIe	89	31	41	---	3.5	5.8
5C3 Blair	IVe	82	29	38	---	3.2	5.4
7C3 Atlas	IVe	---	---	16	36	---	---
8D2 Hickory	IIIe	72	23	28	---	2.7	4.5
8D3 Hickory	IVe	65	20	25	---	2.5	4.1
8E Hickory	IVe	70	23	25	---	2.6	4.4
8E3 Hickory	VIe	---	---	---	---	2.3	3.9
8F Hickory	VIe	---	---	---	---	2.4	4.0
12 Wynoose	IIIw	96	33	46	---	---	---
13A Bluford	IIw	103	33	49	---	4.1	---
13B Bluford	IIe	102	33	49	---	4.1	---
13B2 Bluford	IIe	99	32	47	---	3.9	---
14B Ava	IIe	97	33	48	---	4.3	---
14B2 Ava	IIe	92	31	45	---	4.0	---
14C2 Ava	IIIe	89	30	44	---	3.9	---
14C3 Ava	IVe	74	25	36	---	3.3	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
15B------------- Parke	IIe	120	42	48	---	3.8	---
15C2------------ Parke	IIIe	105	37	42	---	3.4	---
109------------- Racoon	IIIw	108	35	35	---	---	---
301B------------ Grantsburg	IIe	94	33	46	---	4.1	6.7
337------------- Creal	IIw	109	35	51	---	---	---
340C3----------- Zanesville	IVe	60	---	---	45	---	---
340D2----------- Zanesville	IVe	65	---	---	45	---	---
340D3----------- Zanesville	VIe	---	---	---	---	---	---
432------------- Geff	IIw	115	35	49	---	5.1	8.2
434B------------ Ridgway	IIe	118	40	49	---	4.9	8.2
585D3----------- Negley	IVe	---	---	---	---	3.0	---
585F------------ Negley	VIe	---	---	---	---	3.8	---
786E------------ Frondorf	IVe	80	25	---	---	---	---
786F------------ Frondorf	VIe	---	---	---	---	---	---
1108------------ Bonnie	Vw	---	---	---	---	---	---
1524------------ Zipp	Vw	---	---	---	---	---	---
3072------------ Sharon	IIw	90	25	---	---	3.4	---
3108------------ Bonnie	IIIw	96	31	---	---	---	---
3142------------ Patton	IIIw	126	41	---	---	---	---
3208------------ Sexton	IIIw	102	31	---	---	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
3231------------ Evansville	IIw	140	49	---	---	4.6	---
3288------------ Petrolia	IIIw	110	35	40	---	---	---
3382------------ Belknap	IIIw	112	35	---	---	---	6.7
3420------------ Piopolis	IIIw	98	33	---	---	---	---
3422------------ Cape	IIIw	91	30	---	---	---	---
3482C----------- Uniontown	IIIe	90	29	---	---	---	4.5
3483------------ Henshaw	IIIw	129	40	---	---	---	---
3524, 3524+----- Zipp	IIIw	95	33	---	---	3.1	---
3787------------ Banlic	IIIw	104	35	---	---	4.0	6.5
7108------------ Bonnie	IIw	113	37	46	62	---	---
7288------------ Petrolia	IIw	130	43	49	---	---	---
7420------------ Piopolis	IIw	115	39	45	59	---	---
8382------------ Belknap	IIw	124	39	54	---	---	7.6
8787------------ Banlic	IIw	115	37	46	---	4.2	7.0

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
2---------------- Cisne	4W	Slight	Severe	Moderate	Moderate	Pin oak-------------	70	52	Pin oak, green ash, water tupelo, red maple.
						White oak-----------	---	---	
						Black oak-----------	---	---	
						Bitternut hickory---	---	---	
3A, 3B---------- Hoyleton	4A	Slight	Slight	Slight	Slight	White oak-----------	70	52	Shortleaf pine, white oak, eastern white pine, eastern cottonwood, northern red oak, green ash.
						Northern red oak----	70	52	
						Green ash-----------	---	---	
						Bur oak-------------	---	---	
5C2, 5C3-------- Blair	4A	Slight	Slight	Slight	Slight	White oak-----------	70	52	Shortleaf pine, loblolly pine, eastern white pine.
						Northern red oak----	70	52	
						Green ash-----------	---	---	
						Bur oak-------------	70	52	
7C3------------- Atlas	4C	Slight	Slight	Moderate	Moderate	White oak-----------	70	52	Green ash, pin oak, red maple, Austrian pine.
						Northern red oak----	70	52	
						Bur oak-------------	70	52	
						Green ash-----------	---	---	
8D2, 8D3-------- Hickory	5A	Slight	Slight	Slight	Slight	White oak-----------	85	67	White oak, yellow-poplar, black walnut, sugar maple, eastern white pine.
						Northern red oak----	85	67	
						Black oak-----------	---	---	
						Yellow-poplar-------	95	98	
						Green ash-----------	---	---	
8E, 8E3--------- Hickory	5R	Moderate	Moderate	Slight	Slight	White oak-----------	85	67	White oak, yellow-poplar, black walnut, sugar maple, eastern white pine.
						Northern red oak----	85	67	
						Black oak-----------	---	---	
						Yellow-poplar-------	95	98	
						Green ash-----------	---	---	
8F-------------- Hickory	5R	Moderate	Moderate	Slight	Slight	White oak-----------	85	67	White oak, yellow-poplar, eastern white pine, red pine, sugar maple, black walnut.
						Northern red oak----	85	67	
						Black oak-----------	---	---	
						Green ash-----------	---	---	
						Bitternut hickory---	---	---	
						Yellow-poplar-------	95	98	
12-------------- Wynoose	4W	Slight	Severe	Moderate	Moderate	Pin oak-------------	70	52	Pin oak, red maple.
						White oak-----------	---	---	
						Black oak-----------	---	---	
13A, 13B, 13B2-- Bluford	4A	Slight	Slight	Slight	Slight	White oak-----------	70	52	Shortleaf pine, loblolly pine, eastern white pine, eastern redcedar.
						Northern red oak----	70	52	
						Southern red oak----	70	52	
						Green ash-----------	---	---	
						Bur oak-------------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
14B, 14B2, 14C2, 14C3 Ava	4A	Slight	Slight	Slight	Slight	White oak	75	57	Black walnut, eastern cottonwood, sweetgum, yellow-poplar, white oak, American sycamore.
						Northern red oak	80	62	
						Yellow-poplar	90	90	
						Black walnut	---	---	
15B Parke	5A	Slight	Slight	Slight	Slight	White oak	90	72	White oak, yellow-poplar, eastern white pine, red pine, black walnut, white ash, black locust, northern red oak, green ash, black cherry, American sycamore, eastern cottonwood.
						Yellow-poplar	98	104	
						Sweetgum	76	70	
15C2 Parke	5A	Slight	Slight	Slight	Slight	White oak	90	72	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, black locust, northern red oak, green ash, black cherry, American sycamore, eastern cottonwood.
						Yellow-poplar	98	104	
						Sweetgum	76	70	
109 Racoon	4W	Slight	Severe	Severe	Severe	Pin oak	80	62	Pin oak, red maple, baldcypress, water tupelo.
						Post oak	80	62	
						Green ash	---	---	
						White oak	---	---	
301B Grantsburg	3D	Slight	Slight	Moderate	Moderate	White oak	60	43	White ash, eastern white pine, loblolly pine, Scotch pine, eastern redcedar.
						Southern red oak	60	43	
						Black oak	60	43	
						White ash	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
337 Creal	4A	Slight	Slight	Slight	Slight	White oak	70	52	White oak, northern red oak, green ash, eastern white pine, pecan, white ash, yellow-poplar.
						Northern red oak	70	52	
						Green ash	---	---	
						Bur oak	---	---	
340C3 Zanesville	6D	Slight	Slight	Moderate	Moderate	Virginia pine	60	91	Virginia pine, shortleaf pine, eastern white pine, white oak.
						Black oak	60	43	
						White oak	60	43	
						Scarlet oak	---	---	
						Black locust	---	---	
						Post oak	---	---	
340D2 Zanesville	7A	Slight	Slight	Slight	Slight	Virginia pine	66	104	Yellow-poplar, white ash, white oak, northern red oak, eastern white pine, shortleaf pine.
						Black oak	75	57	
						White oak	69	51	
						Hickory	---	---	
						Yellow-poplar	90	90	
						Shortleaf pine	63	95	
						Sweetgum	---	---	
340D3 Zanesville	6D	Slight	Slight	Moderate	Moderate	Virginia pine	60	91	Virginia pine, shortleaf pine, eastern white pine, white oak.
						Black oak	60	43	
						White oak	60	43	
						Scarlet oak	---	---	
						Black locust	---	---	
						Post oak	---	---	
432 Geff	4A	Slight	Slight	Slight	Slight	White oak	70	52	White oak, green ash, yellow-poplar, sugar maple, sweetgum.
						Northern red oak	70	52	
						Green ash	---	---	
						Bur oak	---	---	
434B Ridgway	7A	Slight	Slight	Slight	Slight	Yellow-poplar	95	98	Yellow-poplar, white oak, green ash, black walnut, eastern white pine.
						White oak	85	67	
						Sweetgum	80	79	
						Green ash	76	75	
585D3 Negley	5A	Slight	Slight	Slight	Slight	Northern red oak	94	76	Eastern white pine, black walnut, yellow-poplar, red pine, white ash, white oak, northern red oak.
						Yellow-poplar	99	105	
						White oak	---	---	
						Black walnut	---	---	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
585F------------ Negley	5R	Moderate	Moderate	Slight	Slight	Northern red oak----	94	76	Eastern white pine, yellow-poplar, red pine, white ash, white oak, northern red oak.
						Yellow-poplar-------	99	105	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash-----------	---	---	
786E, 786F------ Frondorf	8R	Moderate	Moderate	Slight	Slight	Virginia pine-------	78	119	Yellow-poplar, shortleaf pine, white oak, eastern white pine, loblolly pine, northern red oak.
						White oak-----------	74	56	
						Black oak-----------	78	60	
						Yellow-poplar-------	---	---	
						Hickory-------------	---	---	
						Sweetgum------------	82	84	
1108------------ Bonnie	5W	Slight	Severe	Severe	Severe	Pin oak-------------	90	72	Eastern cottonwood, red maple, American sycamore, sweetgum, baldcypress, pin oak.
						Eastern cottonwood--	100	128	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
1524------------ Zipp	5W	Slight	Severe	Severe	Severe	Pin oak-------------	86	68	Sweetgum, eastern white pine, baldcypress, red maple, white ash.
						White oak-----------	75	57	
						Sweetgum------------	90	106	
3072------------ Sharon	7A	Slight	Slight	Slight	Slight	Yellow-poplar-------	95	98	Black walnut, pin oak, pecan.
						Eastern cottonwood--	105	141	
						American sycamore---	---	---	
						Cherrybark oak------	---	---	
						Sweetgum------------	---	---	
						Green ash-----------	---	---	
						Southern red oak----	---	---	
3108------------ Bonnie	5W	Slight	Severe	Severe	Severe	Pin oak-------------	90	72	Eastern cottonwood, red maple, American sycamore, sweetgum, baldcypress, pin oak.
						Eastern cottonwood--	100	128	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
3142------------ Patton	5W	Slight	Severe	Moderate	Moderate	Pin oak-------------	85	67	Pin oak, sweetgum, eastern white pine, baldcypress, Norway spruce, red maple, white ash.
						White oak-----------	75	57	
						Sweetgum------------	80	79	
						Northern red oak----	75	57	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
3208------------ Sexton	4W	Slight	Severe	Moderate	Severe	Pin oak-------------	80	62	Baldcypress, pin oak, water tupelo, red maple.
						White oak-----------	---	---	
						Green ash-----------	---	---	
						Yellow-poplar-------	80	71	
3231------------ Evansville	5W	Slight	Moderate	Severe	Severe	Pin oak-------------	90	72	Sweetgum, red maple, eastern white pine, baldcypress, green ash, white ash.
						Swamp white oak-----	75	57	
						Sweetgum------------	90	106	
						Silver maple--------	---	---	
						Eastern cottonwood--	---	---	
						Red maple-----------	---	---	
3288------------ Petrolia	5W	Slight	Moderate	Moderate	Slight	Pin oak-------------	90	72	Eastern cottonwood, red maple, American sycamore, baldcypress, water tupelo.
						Eastern cottonwood--	100	128	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
3382------------ Belknap	6A	Slight	Slight	Slight	Slight	Yellow-poplar-------	90	90	Eastern cottonwood, red maple, American sycamore, sweetgum, baldcypress.
						Eastern cottonwood--	100	128	
						American sycamore---	---	---	
						Sweetgum------------	---	---	
						Pin oak-------------	90	72	
3420------------ Piopolis	5W	Slight	Severe	Severe	Severe	Pin oak-------------	90	72	Eastern cottonwood, red maple, American sycamore, sweetgum, pin oak, baldcypress.
						Eastern cottonwood--	100	128	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
						Post oak------------	---	---	
3422------------ Cape	5W	Slight	Severe	Moderate	Moderate	Pin oak-------------	90	72	American sycamore, silver maple, sweetgum, eastern cottonwood.
						Eastern cottonwood--	100	128	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
3482C----------- Uniontown	6A	Slight	Slight	Slight	Slight	Yellow-poplar-------	89	88	Yellow-poplar, sweetgum, white oak, black walnut, white ash, eastern white pine.
						Northern red oak----	83	65	
						Black oak-----------	82	64	
						Sweetgum------------	79	77	
						Hickory-------------	---	---	
						White oak-----------	---	---	
3483------------ Henshaw	4W	Slight	Moderate	Slight	Slight	Pin oak-------------	95	72	Green ash, sweetgum, eastern cottonwood, eastern white pine.
						Green ash-----------	---	---	
						Sweetgum------------	95	122	
						Hackberry-----------	---	---	
						Red maple-----------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
3524, 3524+----- Zipp	5W	Slight	Severe	Severe	Severe	Pin oak------------- White oak----------- Sweetgum------------	86 75 90	68 57 106	Sweetgum, eastern white pine, baldcypress, red maple, white ash.
3787------------ Banlic	4A	Slight	Slight	Slight	Slight	White oak----------- Pin oak------------- Southern red oak---- Yellow-poplar------- Black walnut--------	75 90 85 --- ---	57 72 67 --- ---	Black walnut, sweetgum, white oak, yellow-poplar, American sycamore, green ash.
7108------------ Bonnie	5W	Slight	Severe	Severe	Severe	Pin oak------------- Eastern cottonwood-- Sweetgum------------ Cherrybark oak------ American sycamore---	90 100 --- --- ---	72 128 --- --- ---	Eastern cottonwood, red maple, American sycamore, sweetgum, baldcypress, pin oak.
7288------------ Petrolia	5W	Slight	Moderate	Moderate	Slight	Pin oak------------- Eastern cottonwood-- Sweetgum------------ Cherrybark oak------ American sycamore---	90 100 --- --- ---	72 128 --- --- ---	Eastern cottonwood, red maple, American sycamore, baldcypress, water tupelo.
7420------------ Piopolis	5W	Slight	Severe	Severe	Severe	Pin oak------------- Eastern cottonwood-- Sweetgum------------ Cherrybark oak------ American sycamore--- Post oak------------	90 100 --- --- --- ---	72 128 --- --- --- ---	Eastern cottonwood, red maple, American sycamore, sweetgum, pin oak, baldcypress.
8382------------ Belknap	6A	Slight	Slight	Slight	Slight	Yellow-poplar------- Eastern cottonwood-- American sycamore--- Sweetgum------------ Pin oak-------------	90 100 --- --- 90	90 128 --- --- 72	Eastern cottonwood, red maple, American sycamore, sweetgum, baldcypress.
8787------------ Banlic	4A	Slight	Slight	Slight	Slight	White oak----------- Pin oak------------- Southern red oak---- Yellow-poplar------- Black walnut--------	75 90 85 --- ---	57 72 67 --- ---	Black walnut, sweetgum, white oak, yellow-poplar, American sycamore, green ash.

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
2----------------- Cisne	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
3A, 3B------------ Hoyleton	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
5C2, 5C3---------- Blair	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
7C3--------------- Atlas	American cranberrybush, silky dogwood, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osage-orange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
8D2, 8D3, 8E, 8E3, 8F--------------- Hickory	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
12---------------- Wynoose	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
13A, 13B, 13B2---- Bluford	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
14B, 14B2, 14C2, 14C3------------- Ava	Washington hawthorn, Amur privet, eastern redcedar, silky dogwood, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
15B, 15C2. Parke	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
109. Racoon	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Washington hawthorn, blue spruce, northern whitecedar, white fir, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
301B. Grantsburg	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osage-orange, green ash, Austrian pine.	Eastern white pine, pin oak.	---
337. Creal	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
340C3, 340D2, 340D3. Zanesville	American cranberrybush, Amur honeysuckle, Tatarian honeysuckle, Amur privet, arrowwood, Washington hawthorn, eastern redcedar.	Hackberry, Osage-orange, Austrian pine.	Pin oak, eastern white pine.	---
432. Geff	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
434B. Ridgway	Amur honeysuckle, Amur privet, silky dogwood, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
585D3, 585F. Negley	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
786E, 786F. Frondorf	Tatarian honeysuckle, Amur honeysuckle, lilac, autumn-olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
1108. Bonnie	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, Washington hawthorn, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
1524 Zipp	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Northern whitecedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
3072 Sharon	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir, Austrian pine.	Norway spruce	Pin oak, eastern white pine.
3108 Bonnie	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, Washington hawthorn, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
3142 Patton	Amur privet, silky dogwood, American cranberrybush, Amur honeysuckle.	White fir, northern whitecedar, blue spruce, Austrian pine, Washington hawthorn, Norway spruce.	Eastern white pine	Pin oak.
3208 Sexton	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
3231 Evansville	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	Northern whitecedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
3288 Petrolia	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	White fir, blue spruce, Washington hawthorn, Norway spruce, Austrian pine, northern whitecedar.	Eastern white pine	Pin oak.
3382 Belknap	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Pin oak, eastern white pine.
3420 Piopolis	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
3422 Cape	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- 8-15	16-25	26-35	>35
3482C: Uniontown	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir.	Norway spruce	Austrian pine, pin oak, eastern white pine.
3483: Henshaw	Silky dogwood, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir, Austrian pine.	Norway spruce	Pin oak, eastern white pine.
3524, 3524+: Zipp	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Northern whitecedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
3787: Banlic	Amur privet, arrowwood, eastern redcedar, Washington hawthorn, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
7108: Bonnie	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, Washington hawthorn, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
7288: Petrolia	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	White fir, blue spruce, Washington hawthorn, Norway spruce, Austrian pine, northern whitecedar.	Eastern white pine	Pin oak.
7420: Piopolis	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
8382: Belknap	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Pin oak, eastern white pine.
8787: Banlic	Amur privet, arrowwood, eastern redcedar, Washington hawthorn, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe")

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
2: Cisne	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
3A, 3B: Hoyleton	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
5C2, 5C3: Blair	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness.
7C3: Atlas	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: slope, wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness, droughty.
8D2, 8D3: Hickory	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
8E, 8E3: Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
8F: Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
12: Wynoose	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
13A, 13B, 13B2: Bluford	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
14B, 14B2: Ava	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Moderate: wetness.
14C2, 14C3: Ava	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: wetness.
15B: Parke	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
15C2: Parke	Slight	Slight	Severe: slope.	Severe: erodes easily.	Slight.
109: Racoon	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
301B: Grantsburg	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Moderate: wetness.
337: Creal	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
340C3------------------ Zanesville	Moderate: percs slowly, wetness.	Moderate: wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Slight.
340D2, 340D3---------- Zanesville	Moderate: slope, percs slowly, wetness.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
432------------------- Geff	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
434B------------------ Ridgway	Slight----------	Slight----------	Moderate: slope.	Severe: erodes easily.	Slight.
585D3----------------- Negley	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
585F------------------ Negley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
786E------------------ Frondorf	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
786F------------------ Frondorf	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1108------------------ Bonnie	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
1524------------------ Zipp	Severe: flooding, ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3072------------------ Sharon	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
3108------------------ Bonnie	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3142------------------ Patton	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3208------------------ Sexton	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
3231------------------ Evansville	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3288------------------ Petrolia	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3382------------------ Belknap	Severe: flooding, wetness.	Moderate: flooding, wetness, percs slowly.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
3420------------------ Piopolis	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3422------------------ Cape	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, flooding, percs slowly.	Severe: wetness.	Severe: wetness, flooding.
3482C----------------- Uniontown	Severe: flooding.	Moderate: flooding.	Severe: slope, flooding.	Severe: erodes easily.	Severe: flooding.
3483------------------ Henshaw	Severe: flooding, wetness.	Moderate: flooding, wetness, percs slowly.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
3524------------------ Zipp	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding, flooding.	Severe: ponding, too clayey.	Severe: ponding, flooding, too clayey.
3524+----------------- Zipp	Severe: flooding, ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3787------------------ Banlic	Severe: flooding, wetness.	Moderate: flooding, wetness, percs slowly.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
7108------------------ Bonnie	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
7288------------------ Petrolia	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
7420------------------ Piopolis	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
8382------------------ Belknap	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
8787------------------ Banlic	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor")

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
2-------------------Cisne	Fair	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
3A------------------Hoyleton	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
3B------------------Hoyleton	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
5C2, 5C3------------Blair	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
7C3-----------------Atlas	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8D2, 8D3, 8E, 8E3---Hickory	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
8F------------------Hickory	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
12------------------Wynoose	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
13A-----------------Bluford	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
13B, 13B2-----------Bluford	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
14B, 14B2, 14C2, 14C3---------------Ava	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
15B-----------------Parke	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
15C2----------------Parke	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
109-----------------Racoon	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
301B----------------Grantsburg	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
337-----------------Creal	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
340C3---------------Zanesville	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
340D2, 340D3--------Zanesville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
432-----------------Geff	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
434B--------------- Ridgway	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
585D3-------------- Negley	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
585F--------------- Negley	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
786E--------------- Frondorf	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
786F--------------- Frondorf	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
1108--------------- Bonnie	Poor	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
1524--------------- Zipp	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
3072--------------- Sharon	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
3108--------------- Bonnie	Poor	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
3142--------------- Patton	Good	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
3208--------------- Sexton	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3231--------------- Evansville	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Fair.
3288--------------- Petrolia	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3382--------------- Belknap	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
3420--------------- Piopolis	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3422--------------- Cape	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3482C-------------- Uniontown	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
3483--------------- Henshaw	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
3524, 3524+-------- Zipp	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
3787--------------- Banlic	Fair	Good	Good	Good	Good	Fair	Good	Good	Good	Fair.
7108--------------- Bonnie	Poor	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
7288---------------- Petrolia	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
7420---------------- Piopolis	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
8382---------------- Belknap	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
8787---------------- Banlic	Fair	Good	Good	Good	Good	Fair	Good	Good	Good	Fair.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2. Cisne	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
3A, 3B. Hoyleton	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness.
5C2, 5C3. Blair	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Moderate: wetness.
7C3. Atlas	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness, droughty.
8D2, 8D3. Hickory	Moderate: wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
8E, 8E3, 8F. Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
12. Wynoose	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
13A, 13B, 13B2. Bluford	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
14B, 14B2. Ava	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Moderate: wetness.
14C2, 14C3. Ava	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Moderate: wetness.
15B. Parke	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
15C2. Parke	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
109---------------Racoon	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
301B--------------Grantsburg	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Moderate: wetness.
337---------------Creal	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
340C3-------------Zanesville	Moderate: depth to rock, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Severe: low strength.	Slight.
340D2, 340D3------Zanesville	Moderate: slope, wetness, depth to rock.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: slope.
432---------------Geff	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
434B--------------Ridgway	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
585D3-------------Negley	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
585F--------------Negley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
786E, 786F--------Frondorf	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1108--------------Bonnie	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
1524--------------Zipp	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding, flooding.
3072--------------Sharon	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.	Severe: flooding.
3108--------------Bonnie	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
3142--------------Patton	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
3208 Sexton	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness, flooding.
3231 Evansville	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
3288 Petrolia	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
3382 Belknap	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding.
3420 Piopolis	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
3422 Cape	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness, flooding.
3482C Uniontown	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
3483 Henshaw	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Severe: flooding.
3524 Zipp	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding, flooding, too clayey.
3524+ Zipp	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding, flooding.
3787 Banlic	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding.
7108 Bonnie	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding.	Severe: ponding.
7288 Petrolia	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding.	Severe: ponding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
7420-------------- Piopolis	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding.	Severe: ponding.
8382-------------- Belknap	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: wetness, flooding.
8787-------------- Banlic	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: wetness, flooding.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2 Cisne	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
3A Hoyleton	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
3B Hoyleton	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
5C2, 5C3 Blair	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
7C3 Atlas	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
8D2, 8D3 Hickory	Moderate: wetness, percs slowly, slope.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, slope.
8E, 8E3 Hickory	Severe: slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Poor: slope.
8F Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
12 Wynoose	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
13A Bluford	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
13B, 13B2 Bluford	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
14B, 14B2 Ava	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
14C2, 14C3 Ava	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
15B Parke	Slight	Moderate: seepage, slope.	Slight	Slight	Good.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
15C2----------------- Parke	Slight-----------	Severe: slope.	Slight-----------	Slight-----------	Good.
109------------------ Racoon	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding, thin layer.
301B----------------- Grantsburg	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
337------------------ Creal	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
340C3---------------- Zanesville	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: depth to rock.	Moderate: depth to rock, wetness.	Fair: too clayey, area reclaim.
340D2, 340D3--------- Zanesville	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: depth to rock.	Moderate: depth to rock, slope, wetness.	Fair: slope, too clayey, area reclaim.
432------------------ Geff	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
434B----------------- Ridgway	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey, thin layer.
585D3---------------- Negley	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, small stones, slope.
585F----------------- Negley	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
786E, 786F----------- Frondorf	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
1108----------------- Bonnie	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
1524----------------- Zipp	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
3072----------------- Sharon	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
3108---------------- Bonnie	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
3142---------------- Patton	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
3208---------------- Sexton	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, wetness.
3231---------------- Evansville	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
3288---------------- Petrolia	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
3382---------------- Belknap	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3420---------------- Piopolis	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
3422---------------- Cape	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
3482C--------------- Uniontown	Severe: flooding, wetness.	Severe: flooding, slope, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
3483---------------- Henshaw	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3524, 3524+--------- Zipp	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
3787---------------- Banlic	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
7108---------------- Bonnie	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
7288----------------- Petrolia	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
7420----------------- Piopolis	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
8382----------------- Belknap	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
8787----------------- Banlic	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
2 Cisne	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
3A, 3B Hoyleton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
5C2, 5C3 Blair	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
7C3 Atlas	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
8D2, 8D3 Hickory	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
8E, 8E3 Hickory	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
8F Hickory	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
12 Wynoose	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
13A, 13B, 13B2 Bluford	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
14B, 14B2, 14C2, 14C3 Ava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
15B, 15C2 Parke	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
109 Racoon	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
301B Grantsburg	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
337 Creal	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
340C3, 340D2, 340D3 Zanesville	Severe: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
432 Geff	Fair: wetness.	Probable	Improbable: too sandy.	Fair: too clayey, small stones.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
434B Ridgway	Good	Probable	Improbable: too sandy.	Fair: too clayey, small stones, area reclaim.
585D3 Negley	Good	Probable	Probable	Poor: small stones.
585F Negley	Poor: slope.	Probable	Probable	Poor: small stones, slope.
786E Frondorf	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
786F Frondorf	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
1108 Bonnie	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1524 Zipp	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
3072 Sharon	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
3108 Bonnie	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3142 Patton	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3208 Sexton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
3231 Evansville	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3288 Petrolia	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3382 Belknap	Fair: thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
3420 Piopolis	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3422 Cape	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
3482C------------------ Uniontown	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
3483------------------ Henshaw	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
3524, 3524+----------- Zipp	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
3787------------------ Banlic	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
7108------------------ Bonnie	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
7288------------------ Petrolia	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
7420------------------ Piopolis	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
8382------------------ Belknap	Fair: thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
8787------------------ Banlic	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
2 Cisne	Slight	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
3A Hoyleton	Slight	Severe: thin layer, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
3B Hoyleton	Moderate: slope.	Severe: thin layer, wetness.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
5C2, 5C3 Blair	Moderate: slope.	Severe: wetness.	Frost action, slope.	Slope, wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
7C3 Atlas	Moderate: slope.	Severe: hard to pack.	Percs slowly, frost action, slope.	Slope, wetness, droughty.	Erodes easily, wetness.	Wetness, erodes easily.
8D2, 8D3, 8E, 8E3 Hickory	Severe: slope.	Slight	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
8F Hickory	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
12 Wynoose	Slight	Severe: wetness.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
13A Bluford	Slight	Severe: piping.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
13B, 13B2 Bluford	Moderate: slope.	Severe: piping.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
14B, 14B2, 14C2, 14C3 Ava	Moderate: seepage, slope.	Severe: piping.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, rooting depth.
15B, 15C2 Parke	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
109 Racoon	Slight	Severe: piping, ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding.	Wetness, erodes easily, percs slowly.
301B Grantsburg	Moderate: seepage, slope.	Moderate: thin layer, piping, wetness.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, rooting depth.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
337: Creal	Slight	Severe: thin layer, wetness.	Frost action	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
340C3: Zanesville	Moderate: depth to rock, seepage.	Severe: piping.	Percs slowly, slope.	Percs slowly, wetness, rooting depth.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth.
340D2, 340D3: Zanesville	Moderate: depth to rock, seepage.	Severe: piping.	Percs slowly, slope.	Percs slowly, wetness, rooting depth.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
432: Geff	Moderate: seepage.	Severe: piping, wetness.	Frost action	Wetness, rooting depth.	Erodes easily, wetness.	Wetness, erodes easily, rooting depth.
434B: Ridgway	Severe: seepage.	Moderate: thin layer.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
585D3, 585F: Negley	Severe: seepage, slope.	Moderate: thin layer.	Deep to water	Slope	Slope	Slope.
786E, 786F: Frondorf	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
1108: Bonnie	Slight	Severe: ponding.	Ponding, flooding, frost action.	Ponding, erodes easily, flooding.	Erodes easily, ponding.	Wetness, erodes easily.
1524: Zipp	Slight	Severe: ponding.	Ponding, percs slowly, flooding.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
3072: Sharon	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
3108: Bonnie	Slight	Severe: ponding.	Ponding, flooding, frost action.	Ponding, erodes easily, flooding.	Erodes easily, ponding.	Wetness, erodes easily.
3142: Patton	Moderate: seepage.	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Erodes easily, ponding.	Wetness, erodes easily.
3208: Sexton	Slight	Severe: thin layer, wetness.	Percs slowly, flooding, frost action.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
3231: Evansville	Moderate: seepage.	Severe: ponding.	Ponding, flooding, frost action.	Ponding, erodes easily, flooding.	Erodes easily, ponding.	Wetness, erodes easily.
3288: Petrolia	Slight	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding	Wetness.
3382: Belknap	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
3420 Piopolis	Slight	Severe: ponding.	Ponding, percs slowly, flooding.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
3422 Cape	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding, frost action.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
3482C Uniontown	Moderate: seepage, slope.	Moderate: piping, wetness.	Flooding, frost action, slope.	Slope, wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
3483 Henshaw	Slight	Severe: wetness.	Flooding, frost action.	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
3524 Zipp	Slight	Severe: ponding.	Ponding, percs slowly, flooding.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
3524+ Zipp	Slight	Severe: ponding.	Ponding, percs slowly, flooding.	Ponding, percs slowly.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
3787 Banlic	Slight	Severe: piping.	Percs slowly, flooding, frost action.	Wetness, percs slowly, rooting depth.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
7108 Bonnie	Slight	Severe: ponding.	Ponding, frost action.	Ponding, erodes easily.	Erodes easily, ponding.	Wetness, erodes easily.
7288 Petrolia	Slight	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
7420 Piopolis	Slight	Severe: ponding.	Ponding, percs slowly.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
8382 Belknap	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
8787 Banlic	Slight	Severe: piping.	Percs slowly, flooding, frost action.	Wetness, percs slowly, rooting depth.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
2------------- Cisne	0-9	Silt loam-----	CL, CL-ML, ML	A-4	0	100	100	90-100	90-100	25-35	5-10
	9-20	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	25-35	5-15
	20-32	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	90-100	90-100	45-60	20-35
	32-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0-5	100	90-100	70-95	50-90	30-50	15-30
3A, 3B-------- Hoyleton	0-9	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	95-100	85-100	25-35	5-15
	9-13	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	25-35	5-15
	13-34	Silty clay loam, silty clay.	CL, CH	A-7	0	100	100	95-100	85-100	40-55	20-30
	34-60	Silt loam, loam, clay loam.	CL, CL-ML	A-6, A-7, A-4	0	100	95-100	90-100	70-95	20-45	5-25
5C2----------- Blair	0-8	Silt loam-----	CL-ML, CL	A-4, A-6	0-2	95-100	90-100	90-100	85-95	20-35	5-15
	8-17	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0-5	95-100	90-100	90-100	80-100	30-50	15-30
	17-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0-5	95-100	90-100	85-100	70-95	30-50	15-30
5C3----------- Blair	0-6	Silt loam-----	CL-ML, CL	A-4, A-6	0-2	95-100	90-100	90-100	85-95	20-35	5-15
	6-28	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0-5	95-100	90-100	90-100	80-100	30-50	15-30
	28-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0-5	95-100	90-100	85-100	70-95	30-50	15-30
7C3----------- Atlas	0-3	Silty clay loam.	CH, CL	A-7	0	100	100	95-100	75-100	40-60	25-40
	3-24	Silty clay loam, clay, clay loam.	CH	A-7	0	100	95-100	95-100	75-95	50-70	30-45
	24-60	Silty clay loam, clay, clay loam.	CH	A-7	0	100	95-100	95-100	75-95	50-70	30-45
8D2----------- Hickory	0-8	Silt loam-----	CL	A-4, A-6	0-1	95-100	90-100	90-100	75-95	20-35	8-15
	8-13	Loam, silt loam.	CL	A-6	0-5	95-100	90-100	80-100	75-95	25-40	10-20
	13-60	Clay loam, loam.	CL	A-7, A-6	0-5	95-100	65-100	70-100	65-80	30-50	15-30
8D3----------- Hickory	0-4	Silt loam-----	CL	A-4, A-6	0-1	95-100	90-100	90-100	75-95	20-35	8-15
	4-11	Loam, silt loam.	CL	A-6	0-5	95-100	90-100	80-100	75-95	25-40	10-20
	11-60	Clay loam, loam.	CL	A-7, A-6	0-5	95-100	65-100	70-100	65-80	30-50	15-30

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
8E------------ Hickory	0-9	Loam----------	CL	A-4, A-6	0-1	95-100	90-100	90-100	75-95	20-35	8-15
	9-15	Loam, silt loam.	CL	A-6	0-5	95-100	90-100	80-100	75-95	25-40	10-20
	15-60	Clay loam, loam.	CL	A-7, A-6	0-5	95-100	65-100	70-100	65-80	30-50	15-30
8E3----------- Hickory	0-4	Clay loam-----	CL	A-6, A-7	0-3	95-100	90-100	90-100	80-95	30-50	15-30
	4-60	Clay loam, loam.	CL	A-7, A-6	0-5	95-100	65-100	70-100	65-80	30-50	15-30
8F------------ Hickory	0-10	Loam----------	CL, ML, CL-ML	A-6, A-4	0-5	95-100	90-100	90-100	75-95	20-35	3-15
	10-60	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	0-5	95-100	65-100	70-95	65-80	30-50	15-30
12------------ Wynoose	0-7	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	95-100	85-95	20-35	5-15
	7-20	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	100	100	95-100	85-95	15-30	2-15
	20-36	Silty clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	85-95	40-55	20-35
	36-60	Silt loam, clay loam, silty clay loam.	CL	A-6, A-7	0	100	95-100	90-100	70-90	30-45	15-25
13A----------- Bluford	0-10	Silt loam-----	CL, CL-ML	A-6, A-4	0	100	95-100	95-100	90-100	20-35	5-15
	10-18	Silt loam-----	ML, CL-ML, CL	A-4	0	100	95-100	95-100	90-100	20-30	NP-10
	18-36	Silty clay loam, silty clay.	CL	A-7, A-6	0	100	95-100	95-100	90-100	35-50	15-30
	36-60	Silt loam, loam, clay loam.	CL-ML, CL	A-6, A-4	0-5	100	95-100	90-100	70-90	25-40	5-20
13B----------- Bluford	0-7	Silt loam-----	CL, CL-ML	A-6, A-4	0	100	95-100	95-100	90-100	20-35	5-15
	7-13	Silt loam-----	ML, CL-ML, CL	A-4	0	100	95-100	95-100	90-100	20-30	NP-10
	13-30	Silty clay loam, silty clay.	CL	A-7, A-6	0	100	95-100	95-100	90-100	35-50	15-30
	30-60	Silt loam, loam, clay loam.	CL-ML, CL	A-6, A-4	0-5	100	95-100	90-100	70-90	25-40	5-20
13B2---------- Bluford	0-7	Silt loam-----	CL, CL-ML	A-6, A-4	0	100	95-100	95-100	90-100	20-35	5-15
	7-21	Silty clay loam, silty clay.	CL	A-7, A-6	0	100	95-100	95-100	90-100	35-50	15-30
	21-60	Silt loam, loam, clay loam.	CL-ML, CL	A-6, A-4	0-5	100	95-100	90-100	70-90	25-40	5-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
14B----------- Ava	0-13	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	100	100	95-100	90-100	25-35	5-15
	13-20	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	25-45	10-20
	20-35	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	25-45	10-20
	35-49	Silty clay loam, loam, clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	100	95-100	90-100	80-90	20-45	5-20
	49-60	Loam, silt loam, clay loam.	CL, ML, CL-ML	A-4, A-6	0	100	95-100	90-100	80-90	25-40	5-20
14B2, 14C2---- Ava	0-7	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	100	100	95-100	90-100	25-35	5-15
	7-24	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	25-45	10-20
	24-32	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	25-45	10-20
	32-60	Silty clay loam, loam, clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	100	95-100	90-100	80-90	20-45	5-20
14C3---------- Ava	0-3	Silty clay loam.	CL	A-6, A-7	0	100	100	95-100	90-100	30-45	10-20
	3-13	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	25-45	10-20
	13-60	Silty clay loam, loam, clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	100	95-100	90-100	80-90	20-45	5-20
15B----------- Parke	0-12	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	90-100	70-100	20-35	7-15
	12-38	Silty clay loam, silt loam.	CL	A-6, A-4	0	95-100	95-100	90-100	80-100	25-40	7-15
	38-68	Sandy clay loam, loam, sandy loam.	SC, CL	A-2, A-6, A-4	0-3	90-100	85-95	55-90	30-60	25-35	7-15
15C2---------- Parke	0-6	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	90-100	70-100	20-35	7-15
	6-35	Silty clay loam, silt loam.	CL	A-6, A-4	0	95-100	95-100	90-100	80-100	25-40	7-15
	35-60	Sandy clay loam, loam, sandy loam.	SC, CL	A-2, A-6, A-4	0-3	90-100	85-95	55-90	30-60	25-35	7-15
109----------- Racoon	0-8	Silt loam-----	CL	A-4, A-6	0	100	100	95-100	90-100	20-40	8-20
	8-27	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	95-100	90-100	20-40	5-20
	27-60	Silty clay loam.	CL	A-6, A-7	0	100	100	95-100	85-100	35-50	15-30
	60-68	Silty clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6, A-7	0	95-100	90-100	75-100	50-100	25-45	3-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
301B---------- Grantsburg	0-12	Silt loam-----	CL, ML	A-4, A-6	0	100	100	100	90-100	30-40	7-15
	12-23	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	90-100	30-45	10-20
	23-44	Silty clay loam, silt loam.	CL, ML	A-6, A-7	0	100	100	100	90-100	35-50	10-25
	44-65	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	90-100	30-45	10-20
337----------- Creal	0-8	Silt loam-----	ML, CL	A-4, A-6	0	100	100	95-100	85-100	30-40	5-15
	8-29	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	95-100	85-100	25-35	4-12
	29-60	Silt loam, silty clay loam.	CL, ML	A-6, A-7	0	100	100	95-100	90-100	35-50	10-25
340C3--------- Zanesville	0-4	Silt loam-----	CL-ML, CL, ML	A-4, A-6	0	95-100	95-100	90-100	80-100	25-40	4-15
	4-12	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	80-100	25-40	5-20
	12-47	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	80-100	60-100	20-40	2-20
	47-60	Sandy clay loam, clay loam, channery sandy clay loam.	SC, CL, SM, GM	A-6, A-4, A-2, A-1-b	0-10	65-100	50-100	40-100	20-85	20-40	2-20
340D2--------- Zanesville	0-6	Silt loam-----	CL-ML, CL, ML	A-4, A-6	0	95-100	95-100	90-100	80-100	25-40	4-15
	6-19	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	80-100	25-40	5-20
	19-41	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	80-100	60-100	20-40	2-20
	41	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
340D3--------- Zanesville	0-4	Silt loam-----	CL-ML, CL, ML	A-4, A-6	0	95-100	95-100	90-100	80-100	25-40	4-15
	4-18	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	80-100	25-40	5-20
	18-32	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0-3	90-100	85-100	80-100	60-100	20-40	2-20
	32-40	Sandy clay loam, clay loam, channery sandy clay loam.	SC, CL, SM, GM	A-6, A-4, A-2, A-1-b	0-10	65-100	50-100	40-100	20-85	20-40	2-20
	40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
432----------- Geff	0-10	Silt loam-----	CL-ML, CL	A-4, A-6	0	95-100	95-100	95-100	95-100	20-35	4-15
	10-15	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	95-100	95-100	95-100	95-100	20-35	4-15
	15-35	Silty clay loam, silt loam.	CL	A-6, A-7	0	95-100	95-100	90-100	90-100	35-45	15-25
	35-60	Stratified silty clay loam to sandy loam.	CL-ML, CL	A-4, A-6	0-2	90-100	80-100	70-100	50-90	15-30	4-15
434B---------- Ridgway	0-7	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	100	95-100	95-100	90-100	20-35	3-15
	7-29	Silty clay loam, silt loam.	CL	A-6	0	100	95-100	95-100	90-100	30-40	15-25
	29-52	Clay loam, loam, sandy loam.	CL, SC, SC-SM, ML	A-4, A-6	0	90-100	85-100	80-90	30-70	20-40	3-15
	52-60	Sand, loamy sand, sandy loam, gravelly loam.	SM, SP-SM	A-2, A-1-b, A-3	0	75-100	50-100	20-60	5-30	---	NP
585D3--------- Negley	0-6	Silt loam-----	ML, CL-ML, CL	A-4, A-6	0	85-100	75-100	70-90	55-85	25-40	4-15
	6-60	Loam, gravelly clay loam, gravelly sandy loam.	SM, ML	A-4, A-2, A-6, A-7	0-5	70-95	50-90	35-80	20-60	25-45	3-17
585F---------- Negley	0-8	Loam----------	ML, CL-ML, CL	A-4, A-6	0	85-100	75-100	70-90	55-85	25-40	4-15
	8-60	Loam, gravelly clay loam, gravelly sandy loam.	SM, ML	A-4, A-2, A-6, A-7	0-5	70-95	50-90	35-80	20-60	25-45	3-17
786E, 786F---- Frondorf	0-11	Silt loam-----	ML, CL, CL-ML	A-4	0-5	90-100	90-100	85-100	75-100	25-35	5-10
	11-28	Channery silty clay loam, channery silt loam, channery loam.	ML, CL, GM, GC	A-4, A-6, A-2, A-7	10-40	55-90	50-85	40-80	30-75	<45	NP-25
	28-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1108---------- Bonnie	0-4	Silt loam-----	CL	A-4, A-6	0	100	100	95-100	90-100	27-34	8-12
	4-45	Silt loam-----	CL	A-4, A-6	0	100	100	95-100	90-100	27-34	8-12
	45-60	Silt loam, silty clay loam.	CL	A-4, A-6	0	100	100	90-100	80-100	25-39	8-15
1524---------- Zipp	0-3	Silty clay loam.	CL	A-6, A-7	0	100	100	95-100	90-95	35-50	15-25
	3-60	Silty clay----	CL, CH	A-7	0	100	100	95-100	90-95	45-60	25-35

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments >3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
3072----------- Sharon	0-8	Silt loam-----	ML, CL, CL-ML	A-4	0	100	100	95-100	85-95	20-30	2-10
	8-34	Silt loam-----	ML, CL, CL-ML	A-4	0	100	100	95-100	85-95	20-30	2-10
	34-60	Silt loam, loam, sandy loam.	ML, CL, SM, SC	A-4	0	100	100	70-95	35-90	15-30	NP-10
3108---------- Bonnie	0-8	Silt loam-----	CL	A-4, A-6	0	100	100	95-100	90-100	27-34	8-12
	8-44	Silt loam-----	CL	A-4, A-6	0	100	100	95-100	90-100	27-34	8-12
	44-60	Silt loam, silty clay loam.	CL	A-4, A-6	0	100	100	90-100	80-100	25-39	8-15
3142---------- Patton	0-11	Silty clay loam.	CL	A-6	0	100	100	95-100	80-95	30-40	15-25
	11-44	Silty clay loam.	CL, CH, ML, MH	A-7, A-7-6	0	100	100	95-100	80-100	40-55	15-25
	44-60	Stratified silt loam to silty clay loam.	CL	A-6	0	100	100	95-100	75-95	25-40	10-20
3208---------- Sexton	0-12	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	25-40	5-15
	12-57	Silty clay loam, silty clay.	CL	A-7, A-6	0	100	100	95-100	90-100	35-50	15-30
	57-65	Stratified sandy loam to silty clay loam.	ML, CL, SM, SC	A-4, A-2, A-6, A-7	0	100	90-100	60-90	25-90	25-45	3-20
3231---------- Evansville	0-10	Silt loam-----	CL	A-4, A-6	0	100	100	90-100	70-90	30-40	8-15
	10-42	Silty clay loam.	CL	A-6, A-7-6	0	100	100	95-100	85-95	35-45	15-25
	42-60	Stratified silt loam to silty clay loam.	CL	A-6, A-7-6	0	100	100	90-100	70-95	35-45	15-25
3288---------- Petrolia	0-6	Silty clay loam.	CL	A-6, A-7	0	100	95-100	90-100	80-100	30-45	10-20
	6-60	Silty clay loam.	CL	A-6, A-7	0	100	95-100	90-100	80-100	35-45	15-25
3382---------- Belknap	0-18	Silt loam-----	ML, CL, CL-ML	A-4	0	100	95-100	90-100	80-100	20-30	2-8
	18-60	Silt loam-----	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	80-100	20-35	NP-12
3420---------- Piopolis	0-7	Silty clay loam.	CL	A-6, A-7	0	100	100	90-100	75-95	35-50	15-25
	7-38	Silty clay loam.	CL	A-6, A-7	0	100	100	90-100	85-95	35-50	15-25
	38-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	90-100	70-95	35-50	15-25

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
3422---------- Cape	0-6	Silty clay loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	20-30
	6-50	Silty clay, clay.	CH	A-7	0	100	100	100	95-100	50-70	30-45
	50-60	Silty clay loam, silty clay.	CL, CH	A-6, A-7	0	100	100	100	90-100	35-65	20-35
3482C--------- Uniontown	0-7	Silt loam-----	CL-ML, CL	A-4	0	100	100	90-100	90-100	20-35	4-15
	7-40	Silty clay loam, silt loam.	CL, ML	A-6, A-7	0	100	100	90-100	90-100	20-40	15-30
	40-54	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	90-100	85-100	20-40	10-30
	54-60	Stratified silt loam to silty clay loam.	CL	A-4, A-6, A-7	0	100	100	85-100	80-100	30-45	10-20
3483---------- Henshaw	0-8	Silt loam-----	ML, CL, CL-ML	A-4	0	95-100	95-100	90-100	80-100	20-35	3-10
	8-50	Silty clay loam, silt loam.	CL	A-6, A-4	0	95-100	95-100	95-100	85-100	30-40	8-15
	50-60	Silt loam, loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	75-100	25-40	5-15
3524---------- Zipp	0-8	Silty clay----	CH, CL	A-7	0	100	100	95-100	90-95	40-55	15-30
	8-46	Silty clay----	CL, CH	A-7	0	100	100	95-100	90-95	45-60	25-35
	46-60	Silty clay----	CL, CH	A-7	0	100	100	90-100	75-95	45-60	25-35
3524+--------- Zipp	0-9	Silt loam-----	CL	A-4, A-6	0	100	100	95-100	90-95	25-30	8-11
	9-60	Silty clay----	CL, CH	A-7	0	100	100	95-100	90-95	45-60	25-35
3787---------- Banlic	0-9	Silt loam-----	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-95	20-30	3-10
	9-30	Silt loam-----	ML, CL-ML, CL	A-4	0	100	95-100	90-100	85-95	20-30	3-10
	30-50	Silt loam, silt.	ML, CL-ML, CL	A-4	0	100	95-100	90-100	85-95	20-30	3-10
	50-60	Silt loam-----	ML, CL-ML, CL	A-4	0	100	95-100	90-100	85-95	20-30	3-10
7108---------- Bonnie	0-7	Silt loam-----	CL	A-4, A-6	0	100	100	95-100	90-100	27-34	8-12
	7-32	Silt loam-----	CL	A-4, A-6	0	100	100	95-100	90-100	27-34	8-12
	32-60	Silt loam, silty clay loam.	CL	A-4, A-6	0	100	100	90-100	80-100	25-39	8-15
7288---------- Petrolia	0-9	Silty clay loam.	CL	A-6, A-7	0	100	95-100	90-100	80-100	30-45	10-20
	9-60	Silty clay loam.	CL	A-6, A-7	0	100	95-100	90-100	80-100	35-45	15-25
7420---------- Piopolis	0-10	Silty clay loam.	CL	A-6, A-7	0	100	100	90-100	75-95	35-50	15-25
	10-42	Silty clay loam.	CL	A-6, A-7	0	100	100	90-100	85-95	35-50	15-25
	42-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	90-100	70-95	35-50	15-25

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
8382---------- Belknap	0-18	Silt loam-----	ML, CL, CL-ML	A-4	0	100	95-100	90-100	80-100	20-30	2-8
	18-60	Silt loam-----	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	80-100	20-35	NP-12
8787---------- Banlic	0-9	Silt loam-----	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-95	20-30	3-10
	9-30	Silt loam-----	ML, CL-ML, CL	A-4	0	100	95-100	90-100	85-95	20-30	3-10
	30-50	Silt loam, silt.	ML, CL-ML, CL	A-4	0	100	95-100	90-100	85-95	20-30	3-10
	50-60	Silt loam-----	ML, CL-ML, CL	A-4	0	100	95-100	90-100	85-95	20-30	3-10

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
2----------------Cisne	0-9	15-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.8	Low-----------	0.37	4	6	1-3
	9-20	15-27	1.25-1.45	0.06-0.6	0.18-0.20	4.5-6.0	Low-----------	0.37			
	20-32	35-45	1.40-1.60	<0.06	0.09-0.15	4.5-6.0	High----------	0.37			
	32-60	25-37	1.50-1.70	<0.06	0.08-0.14	5.1-6.5	Moderate------	0.37			
3A, 3B-----------Hoyleton	0-9	20-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low-----------	0.32	3	6	1-3
	9-13	15-27	1.35-1.60	0.2-0.6	0.16-0.18	4.5-6.5	Low-----------	0.43			
	13-34	35-45	1.40-1.65	0.06-0.2	0.13-0.20	4.5-6.0	High----------	0.43			
	34-60	15-33	1.35-1.70	0.06-0.2	0.17-0.22	5.1-7.3	Moderate------	0.43			
5C2--------------Blair	0-8	20-27	1.35-1.55	0.6-2.0	0.15-0.24	5.1-7.3	Low-----------	0.37	5	6	1-3
	8-17	25-35	1.45-1.60	0.2-0.6	0.16-0.21	4.5-6.0	Moderate------	0.37			
	17-60	18-35	1.45-1.60	0.2-0.6	0.16-0.21	5.1-7.8	Moderate------	0.37			
5C3--------------Blair	0-6	20-27	1.35-1.55	0.6-2.0	0.15-0.24	5.1-7.3	Low-----------	0.37	5	6	.5-1
	6-28	25-35	1.45-1.60	0.2-0.6	0.16-0.21	4.5-6.0	Moderate------	0.37			
	28-60	18-35	1.45-1.60	0.2-0.6	0.16-0.21	5.1-7.8	Moderate------	0.37			
7C3--------------Atlas	0-3	30-40	1.35-1.55	0.06-0.2	0.14-0.19	4.5-7.3	High----------	0.43	2	7	.5-1
	3-24	35-45	1.35-1.55	<0.06	0.07-0.19	4.5-7.3	High----------	0.32			
	24-60	30-45	1.35-1.55	<0.06	0.07-0.19	4.5-7.8	High----------	0.32			
8D2--------------Hickory	0-8	15-27	1.20-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low-----------	0.37	5	6	1-2
	8-13	15-27	1.30-1.45	0.6-2.0	0.17-0.19	4.5-6.0	Low-----------	0.37			
	13-60	24-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-7.3	Moderate------	0.37			
8D3--------------Hickory	0-4	15-27	1.20-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low-----------	0.37	5	6	.5-1
	4-11	15-27	1.30-1.45	0.6-2.0	0.17-0.19	4.5-6.0	Low-----------	0.37			
	11-60	24-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-7.3	Moderate------	0.37			
8E---------------Hickory	0-9	15-27	1.20-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low-----------	0.37	5	6	1-2
	9-15	15-27	1.30-1.45	0.6-2.0	0.17-0.19	4.5-6.0	Low-----------	0.37			
	15-60	24-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-7.3	Moderate------	0.37			
8E3--------------Hickory	0-4	27-35	1.30-1.45	0.6-2.0	0.18-0.20	5.1-7.3	Moderate------	0.37	4	6	.5-1
	4-60	24-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-7.3	Moderate------	0.37			
8F---------------Hickory	0-10	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-7.3	Low-----------	0.37	5	6	1-2
	10-60	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-7.3	Moderate------	0.28			
12---------------Wynoose	0-7	15-25	1.25-1.45	0.6-2.0	0.22-0.24	4.5-7.8	Low-----------	0.43	3	6	.5-2
	7-20	12-18	1.30-1.50	0.06-0.2	0.18-0.20	3.6-7.3	Low-----------	0.43			
	20-36	35-42	1.40-1.60	<0.06	0.09-0.13	3.6-6.0	High----------	0.43			
	36-60	25-37	1.50-1.70	0.06-0.2	0.11-0.15	3.6-6.0	Moderate------	0.43			
13A--------------Bluford	0-10	20-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low-----------	0.43	3	6	1-3
	10-18	15-25	1.40-1.60	0.2-0.6	0.18-0.20	3.6-6.0	Low-----------	0.43			
	18-36	35-42	1.45-1.65	0.06-0.6	0.11-0.20	3.6-5.5	Moderate------	0.43			
	36-60	22-35	1.60-1.70	0.06-0.2	0.11-0.16	3.6-6.0	Moderate------	0.43			
13B--------------Bluford	0-7	20-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low-----------	0.43	3	6	1-3
	7-13	15-25	1.40-1.60	0.2-0.6	0.18-0.20	3.6-6.0	Low-----------	0.43			
	13-30	35-42	1.45-1.65	0.06-0.6	0.11-0.20	3.6-5.5	Moderate------	0.43			
	30-60	22-35	1.60-1.70	0.06-0.2	0.11-0.16	3.6-6.0	Moderate------	0.43			
13B2-------------Bluford	0-7	20-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low-----------	0.43	3	6	1-3
	7-21	35-42	1.45-1.65	0.06-0.6	0.11-0.20	3.6-5.5	Moderate------	0.43			
	21-60	22-35	1.60-1.70	0.06-0.2	0.11-0.16	3.6-6.0	Moderate------	0.43			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
14B-------------- Ava	0-13	20-27	1.40-1.60	0.6-2.0	0.21-0.24	4.5-7.3	Low----------	0.43	4	6	.5-2
	13-20	22-33	1.40-1.60	0.6-2.0	0.18-0.21	4.5-5.5	Moderate-----	0.43			
	20-35	24-35	1.50-1.70	0.2-0.6	0.18-0.21	4.5-5.5	Moderate-----	0.43			
	35-49	20-30	1.55-1.80	<0.06	0.09-0.11	4.5-5.5	Low----------	0.43			
	49-60	20-30	1.55-1.75	0.2-0.6	0.05-0.10	4.5-6.0	Low----------	0.43			
14B2, 14C2------- Ava	0-7	20-27	1.40-1.60	0.6-2.0	0.21-0.24	4.5-7.3	Low----------	0.43	4	6	.5-2
	7-24	22-33	1.40-1.60	0.6-2.0	0.18-0.21	4.5-5.5	Moderate-----	0.43			
	24-32	24-35	1.50-1.70	0.2-0.6	0.18-0.21	4.5-5.5	Moderate-----	0.43			
	32-60	20-30	1.55-1.80	<0.06	0.09-0.11	4.5-5.5	Low----------	0.43			
14C3------------- Ava	0-3	27-35	1.35-1.55	0.6-2.0	0.15-0.19	4.5-7.3	Moderate-----	0.43	3	7	.5-2
	3-13	24-35	1.50-1.70	0.2-0.6	0.18-0.21	4.5-5.5	Moderate-----	0.43			
	13-60	20-30	1.55-1.80	<0.06	0.09-0.11	4.5-5.5	Low----------	0.43			
15B-------------- Parke	0-12	18-27	1.25-1.40	0.6-2.0	0.22-0.24	5.1-6.5	Low----------	0.37	5	6	.5-2
	12-38	22-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.37			
	38-68	18-30	1.55-1.65	0.6-2.0	0.16-0.18	4.5-5.5	Low----------	0.28			
15C2------------- Parke	0-6	18-27	1.25-1.40	0.6-2.0	0.22-0.24	5.1-6.5	Low----------	0.37	5	6	.5-2
	6-35	22-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.37			
	35-60	18-30	1.55-1.65	0.6-2.0	0.16-0.18	4.5-5.5	Low----------	0.28			
109-------------- Racoon	0-8	18-27	1.30-1.50	0.2-0.6	0.22-0.24	4.5-7.3	Low----------	0.37	3	6	1-2
	8-27	18-27	1.35-1.55	0.2-0.6	0.20-0.22	4.5-7.3	Low----------	0.37			
	27-60	27-35	1.35-1.60	0.06-0.2	0.18-0.20	4.5-6.0	Moderate-----	0.37			
	60-68	18-35	1.40-1.65	0.2-0.6	0.15-0.20	4.5-6.0	Moderate-----	0.37			
301B------------- Grantsburg	0-12	13-25	1.10-1.40	0.6-2.0	0.20-0.24	3.6-6.5	Low----------	0.43	3	6	.5-3
	12-23	20-30	1.30-1.60	0.6-2.0	0.18-0.20	3.6-5.5	Moderate-----	0.43			
	23-44	25-35	1.50-1.70	0.2-0.6	0.06-0.08	3.6-5.5	Moderate-----	0.43			
	44-65	20-32	1.55-1.80	<0.06	0.08-0.10	3.6-5.5	Moderate-----	0.43			
337-------------- Creal	0-8	20-27	1.30-1.50	0.2-0.6	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
	8-29	18-25	1.35-1.60	0.2-0.6	0.18-0.20	3.6-7.3	Low----------	0.37			
	29-60	25-35	1.35-1.60	0.2-0.6	0.18-0.20	4.5-6.5	Moderate-----	0.37			
340C3------------ Zanesville	0-4	12-27	1.35-1.40	0.6-2.0	0.19-0.23	4.5-6.0	Low----------	0.43	3	5	.5-2
	4-12	18-35	1.35-1.45	0.6-2.0	0.17-0.22	4.5-6.0	Low----------	0.37			
	12-47	18-33	1.50-1.75	0.06-0.6	0.08-0.12	4.5-6.0	Low----------	0.37			
	47-60	20-40	1.50-1.70	0.2-2.0	0.08-0.12	4.5-6.0	Low----------	0.28			
340D2------------ Zanesville	0-6	12-27	1.35-1.40	0.6-2.0	0.19-0.23	4.5-6.0	Low----------	0.43	3	5	1-2
	6-19	18-35	1.35-1.45	0.6-2.0	0.17-0.22	4.5-6.0	Low----------	0.37			
	19-41	18-33	1.50-1.75	0.06-0.6	0.08-0.12	4.5-6.0	Low----------	0.37			
	41	---	---	0.0-0.2	---	---	-------------	----			
340D3------------ Zanesville	0-4	12-27	1.35-1.40	0.6-2.0	0.19-0.23	4.5-6.0	Low----------	0.43	3	5	.5-2
	4-18	18-35	1.35-1.45	0.6-2.0	0.17-0.22	4.5-6.0	Low----------	0.37			
	18-32	18-33	1.50-1.75	0.06-0.6	0.08-0.12	4.5-6.0	Low----------	0.37			
	32-40	20-40	1.50-1.70	0.2-2.0	0.08-0.12	4.5-6.0	Low----------	0.28			
	40	---	---	0.0-0.2	---	---	-------------	----			
432-------------- Geff	0-10	18-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	6	1-3
	10-15	18-27	1.35-1.45	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.43			
	15-35	24-35	1.35-1.55	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.43			
	35-60	15-30	1.40-1.75	0.6-2.0	0.15-0.18	4.5-7.3	Low----------	0.32			
434B------------- Ridgway	0-7	14-27	1.15-1.35	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
	7-29	22-35	1.35-1.55	0.6-2.0	0.16-0.20	4.5-7.3	Moderate-----	0.43			
	29-52	10-30	1.45-1.65	0.6-6.0	0.11-0.18	4.5-6.5	Low----------	0.32			
	52-60	2-10	1.55-1.85	6.0-20	0.05-0.10	5.6-7.3	Low----------	0.17			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
585D3	0-6	12-27	1.30-1.50	2.0-6.0	0.16-0.22	4.5-7.3	Low	0.32	5-4	5	.5-2
Negley	6-60	18-35	1.30-1.60	0.6-6.0	0.10-0.16	4.5-6.5	Low	0.32			
585F	0-8	12-27	1.30-1.50	2.0-6.0	0.16-0.22	4.5-7.3	Low	0.32	5-4	5	1-3
Negley	8-60	18-35	1.30-1.60	0.6-6.0	0.10-0.16	4.5-6.5	Low	0.32			
786E, 786F	0-11	18-27	1.20-1.40	0.6-2.0	0.18-0.22	4.5-5.5	Low	0.37	3	5	1-3
Frondorf	11-28	18-35	1.20-1.45	0.6-2.0	0.08-0.16	4.5-5.5	Low	0.17			
	28-60	---	---	0.00-2.0	---	---	---	---			
1108	0-4	18-27	1.30-1.50	0.6-2.0	0.22-0.25	4.5-7.3	Low	0.43	5	6	1-3
Bonnie	4-45	18-27	1.35-1.55	0.2-0.6	0.21-0.24	4.5-5.5	Low	0.43			
	45-60	18-30	1.35-1.55	0.2-0.6	0.14-0.24	4.5-7.8	Low	0.43			
1524	0-3	27-40	1.40-1.60	0.2-0.6	0.20-0.22	5.6-7.3	Moderate	0.28	5	7	1-3
Zipp	3-60	40-55	1.45-1.65	0.06-0.2	0.11-0.13	5.6-7.3	High	0.28			
3072	0-8	10-18	1.30-1.50	0.6-2.0	0.22-0.24	4.5-5.5	Low	0.37	5	5	.5-2
Sharon	8-34	10-18	1.30-1.50	0.6-2.0	0.20-0.22	4.5-5.5	Low	0.37			
	34-60	5-18	1.35-1.65	0.6-2.0	0.11-0.22	4.5-5.5	Low	0.37			
3108	0-8	18-27	1.30-1.50	0.6-2.0	0.22-0.25	4.5-7.3	Low	0.43	5	6	1-3
Bonnie	8-44	18-27	1.35-1.55	0.2-0.6	0.21-0.24	4.5-5.5	Low	0.43			
	44-60	18-30	1.35-1.55	0.2-0.6	0.14-0.24	4.5-7.8	Low	0.43			
3142	0-11	27-35	1.15-1.35	0.6-2.0	0.21-0.23	6.6-7.3	Moderate	0.28	5	7	3-5
Patton	11-44	27-35	1.25-1.45	0.6-2.0	0.18-0.20	6.1-7.8	Moderate	0.43			
	44-60	22-35	1.30-1.50	0.2-0.6	0.18-0.22	7.4-8.4	Moderate	0.43			
3208	0-12	12-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-6.5	Low	0.43	3	6	2-3
Sexton	12-57	35-42	1.35-1.55	0.06-0.2	0.18-0.20	5.1-6.0	High	0.43			
	57-65	10-30	1.40-1.70	0.2-0.6	0.11-0.20	5.6-6.5	Low	0.43			
3231	0-10	20-27	1.30-1.45	0.6-2.0	0.20-0.24	6.1-7.3	Low	0.37	5	6	1-3
Evansville	10-42	27-35	1.45-1.55	0.6-2.0	0.18-0.20	6.1-7.8	Moderate	0.37			
	42-60	25-35	1.45-1.55	0.6-2.0	0.19-0.21	6.6-8.4	Low	0.37			
3288	0-6	27-35	1.20-1.40	0.2-0.6	0.21-0.23	5.6-8.4	Moderate	0.32	5	7	2-3
Petrolia	6-60	27-35	1.35-1.45	0.2-0.6	0.18-0.20	6.1-7.3	Moderate	0.32			
3382	0-18	8-18	1.35-1.55	0.2-2.0	0.21-0.25	4.5-7.3	Low	0.37	5	5	1-3
Belknap	18-60	8-25	1.40-1.60	0.2-0.6	0.21-0.24	4.5-6.0	Low	0.37			
3420	0-7	27-35	1.20-1.40	0.06-0.2	0.21-0.23	5.1-6.5	Moderate	0.43	5	7	1-3
Piopolis	7-38	27-35	1.40-1.60	0.06-0.2	0.18-0.20	4.5-5.5	Moderate	0.43			
	38-60	25-38	1.50-1.70	0.06-0.2	0.18-0.20	5.1-7.3	Moderate	0.43			
3422	0-6	30-40	1.25-1.45	0.06-0.2	0.15-0.19	4.5-7.3	Moderate	0.32	5	7	1-3
Cape	6-50	40-60	1.30-1.50	<0.06	0.10-0.13	3.6-5.5	High	0.32			
	50-60	35-60	1.25-1.50	0.06-0.2	0.11-0.19	3.6-5.5	Moderate	0.32			
3482C	0-7	18-27	1.25-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.37	5	6	.5-2
Uniontown	7-40	20-35	1.25-1.40	0.6-2.0	0.18-0.22	5.1-6.5	Low	0.37			
	40-54	20-35	1.30-1.45	0.6-2.0	0.18-0.22	5.1-7.3	Low	0.37			
	54-60	20-30	1.30-1.45	0.6-2.0	0.18-0.22	6.6-8.4	Low	0.37			
3483	0-8	18-27	1.20-1.40	0.6-2.0	0.18-0.23	5.6-7.3	Low	0.43	5	6	0-2
Henshaw	8-50	20-35	1.20-1.40	0.2-0.6	0.15-0.19	5.1-7.3	Moderate	0.43			
	50-60	15-27	1.25-1.45	0.2-0.6	0.15-0.22	6.6-8.4	Low	0.43			
3524	0-8	40-50	1.40-1.60	0.06-0.2	0.12-0.14	5.6-7.3	High	0.28	5	4	1-3
Zipp	8-46	40-55	1.45-1.65	0.06-0.2	0.11-0.13	5.6-7.3	High	0.28			
	46-60	40-55	1.50-1.70	<0.2	0.08-0.10	6.6-7.8	High	0.28			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
3524+	0-9	20-27	1.30-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.37	5	6	1-3
Zipp	9-60	40-55	1.45-1.65	0.06-0.2	0.11-0.13	5.6-7.3	High	0.28			
3787	0-9	10-18	1.40-1.60	0.2-0.6	0.20-0.24	5.1-7.8	Low	0.43	4	5	.5-1
Banlic	9-30	12-18	1.40-1.60	0.06-0.2	0.20-0.22	4.5-7.3	Low	0.43			
	30-50	10-18	1.65-1.90	0.06-0.2	0.10-0.11	4.5-6.0	Low	0.43			
	50-60	12-18	1.50-1.70	0.2-0.6	0.05-0.08	4.5-6.5	Low	0.43			
7108	0-7	18-27	1.30-1.50	0.6-2.0	0.22-0.25	4.5-7.3	Low	0.43	5	6	1-3
Bonnie	7-32	18-27	1.35-1.55	0.2-0.6	0.21-0.24	4.5-5.5	Low	0.43			
	32-60	18-30	1.35-1.55	0.2-0.6	0.14-0.24	4.5-7.8	Low	0.43			
7288	0-9	27-35	1.20-1.40	0.2-0.6	0.21-0.23	5.6-8.4	Moderate	0.32	5	7	2-3
Petrolia	9-60	27-35	1.35-1.45	0.2-0.6	0.18-0.20	6.1-7.3	Moderate	0.32			
7420	0-10	27-35	1.20-1.40	0.06-0.2	0.21-0.23	5.1-6.5	Moderate	0.43	5	7	1-3
Piopolis	10-42	27-35	1.40-1.60	0.06-0.2	0.18-0.20	4.5-5.5	Moderate	0.43			
	42-60	25-38	1.50-1.70	0.06-0.2	0.18-0.20	5.1-7.3	Moderate	0.43			
8382	0-18	8-18	1.35-1.55	0.2-2.0	0.21-0.25	4.5-7.3	Low	0.37	5	5	1-3
Belknap	18-60	8-25	1.40-1.60	0.2-0.6	0.21-0.24	4.5-6.0	Low	0.37			
8787	0-9	10-18	1.40-1.60	0.2-0.6	0.20-0.24	5.1-7.8	Low	0.43	4	5	.5-1
Banlic	9-30	12-18	1.40-1.60	0.06-0.2	0.20-0.22	4.5-7.3	Low	0.43			
	30-50	10-18	1.65-1.90	0.06-0.2	0.10-0.11	4.5-6.0	Low	0.43			
	50-60	12-18	1.50-1.70	0.2-0.6	0.05-0.08	4.5-6.5	Low	0.43			

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the tex
< means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that
estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Ri
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Unc st
					Ft			In			
2 Cisne	D	None	---	---	0-2.0	Perched	Dec-May	>60	---	High	Hig
3A, 3B Hoyleton	C	None	---	---	1.0-3.0	Apparent	Jan-Apr	>60	---	High	Hig
5C2, 5C3 Blair	C	None	---	---	1.5-3.5	Apparent	Jan-Apr	>60	---	High	Hig
7C3 Atlas	D	None	---	---	1.0-2.0	Perched	Apr-Jun	>60	---	High	Hig
8D2, 8D3, 8E, 8E3 Hickory	C	None	---	---	4.0-6.0	Apparent	Jan-Apr	>60	---	Moderate	Mod
8F Hickory	C	None	---	---	>6.0	---	---	>60	---	Moderate	Mod
12 Wynoose	D	None	---	---	0-2.0	Perched	Dec-May	>60	---	High	Hig
13A, 13B, 13B2 Bluford	C	None	---	---	1.0-3.0	Perched	Jan-Apr	>60	---	High	Hig
14B, 14B2, 14C2, 14C3 Ava	C	None	---	---	1.5-3.5	Perched	Jan-Apr	>60	---	High	Mod
15B, 15C2 Parke	B	None	---	---	>6.0	---	---	>60	---	High	Mod
109 Racoon	C/D	None	---	---	+.5-1.0	Apparent	Dec-Apr	>60	---	High	Hig
301B Grantsburg	C	None	---	---	1.5-3.5	Perched	Feb-Apr	>60	---	High	Hig
337 Creal	C	None	---	---	1.0-3.0	Apparent	Jan-Apr	>60	---	High	Hig

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro- logic group	Flooding			High water table			Bedrock		Potential frost action	Ri
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Unc s
					Ft			In			
340C3, 340D2, 340D3 Zanesville	C	None	---	---	2.0-3.0	Perched	Jan-Apr	>40	Hard	---	Moc
432 Geff	C	None	---	---	1.0-3.0	Apparent	Jan-Apr	>60	---	High	Hic
434B Ridgway	B	None	---	---	>6.0	---	---	>60	---	High	Moc
585D3, 585F Negley	B	None	---	---	>6.0	---	---	>60	---	Moderate	Lov
786E, 786F Frondorf	B	None	---	---	>6.0	---	---	20-40	Soft	---	Moc
1108 Bonnie	C/D	Frequent	Long	Dec-Mar	+.5-1.0	Apparent	Jan-Jun	>60	---	High	Hic
1524 Zipp	D	Frequent	Long	Dec-Mar	+.5-1.0	Apparent	Dec-May	>60	---	Moderate	Hic
3072 Sharon	B	Frequent	Brief	Dec-Mar	3.0-6.0	Apparent	Jan-Apr	>60	---	High	Lov
3108 Bonnie	C/D	Frequent	Brief	Dec-Mar	+.5-1.0	Apparent	Dec-May	>60	---	High	Hic
3142 Patton	B/D	Frequent	Brief	Dec-Mar	+.5-2.0	Apparent	Dec-May	>60	---	High	Hic
3208 Sexton	C/D	Frequent	Brief	Dec-Mar	0-2.0	Apparent	Dec-May	>60	---	High	Hic
3231 Evansville	B/D	Frequent	Brief	Dec-Mar	+.5-1.0	Apparent	Dec-May	>60	---	High	Hic
3288 Petrolia	C/D	Frequent	Brief	Dec-Apr	+.5-3.0	Apparent	Dec-May	>60	---	High	Hic
3382 Belknap	C	Frequent	Brief	Dec-Mar	1.0-3.0	Apparent	Jan-Apr	>60	---	High	Hic
3420 Piopolis	C/D	Frequent	Brief	Dec-Mar	+.5-3.0	Apparent	Dec-May	>60	---	High	Hic
3422 Cape	D	Frequent	Brief	Dec-Mar	0-1.0	Perched	Dec-May	>60	---	High	Hic

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Ri
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Unc s
					Ft			In			
3482C------------- Uniontown	B	Frequent----	Brief-----	Dec-Mar	2.5-6.0	Apparent	Jan-Apr	>60	---	High-----	Low
3483-------------- Henshaw	C	Frequent----	Brief-----	Dec-Mar	1.0-2.0	Apparent	Jan-Apr	>60	---	High-----	Hig
3524, 3524+------- Zipp	D	Frequent----	Brief-----	Dec-Mar	+.5-1.0	Apparent	Dec-May	>60	---	Moderate	Hig
3787-------------- Banlic	C	Frequent----	Brief-----	Dec-Mar	1.0-3.0	Perched	Jan-Apr	>60	---	High-----	Hig
7108-------------- Bonnie	C/D	Rare--------	---	---	+.5-1.0	Apparent	Jan-Jun	>60	---	High-----	Hig
7288-------------- Petrolia	C/D	Rare--------	---	---	+.5-3.0	Apparent	Dec-May	>60	---	High-----	Hig
7420-------------- Piopolis	C/D	Rare--------	---	---	+.5-3.0	Apparent	Dec-May	>60	---	High-----	Hig
8382-------------- Belknap	C	Occasional	Brief-----	Dec-Mar	1.0-3.0	Apparent	Jan-Apr	>60	---	High-----	Hig
8787-------------- Banlic	C	Occasional	Brief-----	Dec-Mar	1.0-3.0	Perched	Jan-Apr	>60	---	High-----	Hig

TABLE 18.--ENGINEERING INDEX TEST DATA

(MAX means maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; and UN

Soil name	Sample number	Horizon	Depth	Moisture density MAX	Moisture density OPT	Percentage passing sieve-- No. 4	No. 10	No. 40	No. 200	LL	PI
			In	Lb/ cu ft	Pct					Pct	
Banlic	84IL-191-10-1	Ap	0-9	109.2	16.3	99.6	96.4	92.1	84.0	26.2	6.7
	10-5	Bxg1	30-39	107.5	17.3	100.0	95.5	89.3	82.7	25.5	3.7
Belknap	86IL-191-54-1	Ap	0-9	104.4	17.0	100.0	99.8	98.8	91.9	31.5	7.9
	54-2	C1	9-31	110.3	15.8	100.0	99.4	97.6	90.3	24.6	5.6
Blair	86IL-191-33-1	Ap	0-8	112.5	14.6	100.0	99.9	94.3	77.2	25.9	6.1
	33-3	Btg1	20-36	111.2	16.1	99.1	95.8	89.7	68.3	35.4	19.1
	33-4	Btg2	36-60	113.8	15.5	97.4	94.8	87.0	62.4	40.5	23.9
Bluford	84IL-191-14-1	Ap	0-9	107.1	15.0	99.8	92.6	85.8	75.5	25.0	3.6
	14-4	Btg1	20-26	111.4	16.8	98.2	97.8	94.7	83.2	30.8	13.4
	14-7	2Btx2	44-60	99.2	20.0	100.0	99.7	97.9	93.0	44.7	18.7
Bonnie	85IL-191-23-1	Ap	0-6	109.2	16.8	100.0	99.7	96.0	88.8	29.3	8.1
	23-3	Cg2	22-32	112.5	16.0	100.0	99.9	97.4	89.6	28.3	10.5
Cisne	86IL-191-32-1	Ap	0-8	104.9	17.5	100.0	99.3	95.3	87.3	31.6	9.2
	32-4	Btg1	22-34	101.9	21.0	100.0	99.9	99.2	89.8	53.2	26.3
	32-6	2Btg3	42-50	102.1	19.8	100.0	99.9	99.1	88.5	56.1	39.6
Hickory	83IL-191-20-1	Ap	0-5	116.0	12.8	98.6	96.1	89.1	58.4	21.4	3.5
	20-4	Bt2	15-26	122.1	14.0	97.2	93.8	86.1	56.9	31.4	16.1
	20-6	Bt4	37-51	119.5	13.4	98.1	96.1	89.9	60.8	26.6	12.1
Patton	86IL-191-92-1	Ap	0-11	108.7	16.2	100.0	98.7	97.0	89.5	31.5	12.4
	92-2	Bg	11-18	104.4	20.1	100.0	99.4	98.1	89.3	45.9	25.6
	92-5	BCg	44-50	110.7	17.0	99.9	99.4	98.6	95.2	32.4	13.9
Sexton	86IL-191-102-1	Ap	0-9	114.3	14.0	100.0	99.8	97.5	79.1	24.4	8.1
	102-2	Eg	9-12	107.2	17.5	100.0	99.7	98.5	84.5	44.3	26.2
	102-3	Bt1	12-18	104.3	20.8	100.0	99.1	98.1	85.0	35.0	17.9
Wynoose	84IL-191-18-1	Ap	0-7	110.1	15.6	100.0	99.0	95.7	81.1	27.2	8.3
	18-4	Btg1	20-29	103.3	19.5	99.9	99.2	97.3	87.5	43.7	20.2
	18-6	2Btg3	36-60	108.3	18.0	99.8	99.7	97.1	85.3	39.5	20.3
Zanesville	84IL-191-21-1	Ap	0-4	106.5	16.8	100.0	99.9	92.6	90.0	33.3	12.6
	21-3	2Btx1	12-27	110.7	17.8	99.3	98.8	95.5	82.0	33.6	15.3
	21-6	3BC	47-60	111.5	17.3	96.5	87.6	79.6	61.8	31.9	12.4

TABLE 19.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Atlas	Fine, montmorillonitic, mesic, sloping Aeric Ochraqualfs
Ava	Fine-silty, mixed, mesic Typic Fragiudalfs
Banlic	Coarse-silty, mixed, nonacid, mesic Aeric Haplaquepts
Belknap	Coarse-silty, mixed, acid, mesic Aeric Fluvaquents
*Blair	Fine-silty, mixed, mesic Aquic Hapludalfs
Bluford	Fine, montmorillonitic, mesic Aeric Ochraqualfs
Bonnie	Fine-silty, mixed, acid, mesic Typic Fluvaquents
Cape	Fine, montmorillonitic, acid, mesic Typic Fluvaquents
Cisne	Fine, montmorillonitic, mesic Mollic Albaqualfs
Creal	Fine-silty, mixed, mesic Aeric Ochraqualfs
Evansville	Fine-silty, mixed, nonacid, mesic Typic Haplaquepts
Frondorf	Fine-loamy, mixed, mesic Ultic Hapludalfs
Geff	Fine-silty, mixed, mesic Aquic Hapludalfs
Grantsburg	Fine-silty, mixed, mesic Typic Fragiudalfs
Henshaw	Fine-silty, mixed, mesic Aquic Hapludalfs
Hickory	Fine-loamy, mixed, mesic Typic Hapludalfs
Hoyleton	Fine, montmorillonitic, mesic Aquollic Hapludalfs
Negley	Fine-loamy, mixed, mesic Typic Paleudalfs
Parke	Fine-silty, mixed, mesic Ultic Hapludalfs
Patton	Fine-silty, mixed, mesic Typic Haplaquolls
Petrolia	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Piopolis	Fine-silty, mixed, acid, mesic Typic Fluvaquents
Racoon	Fine-silty, mixed, mesic Typic Ochraqualfs
Ridgway	Fine-silty, mixed, mesic Typic Hapludalfs
Sexton	Fine, montmorillonitic, mesic Typic Ochraqualfs
Sharon	Coarse-silty, mixed, acid, mesic Typic Udifluvents
Uniontown	Fine-silty, mixed, mesic Typic Hapludalfs
Wynoose	Fine, montmorillonitic, mesic Typic Albaqualfs
Zanesville	Fine-silty, mixed, mesic Typic Fragiudalfs
Zipp	Fine, mixed, nonacid, mesic Typic Haplaquepts

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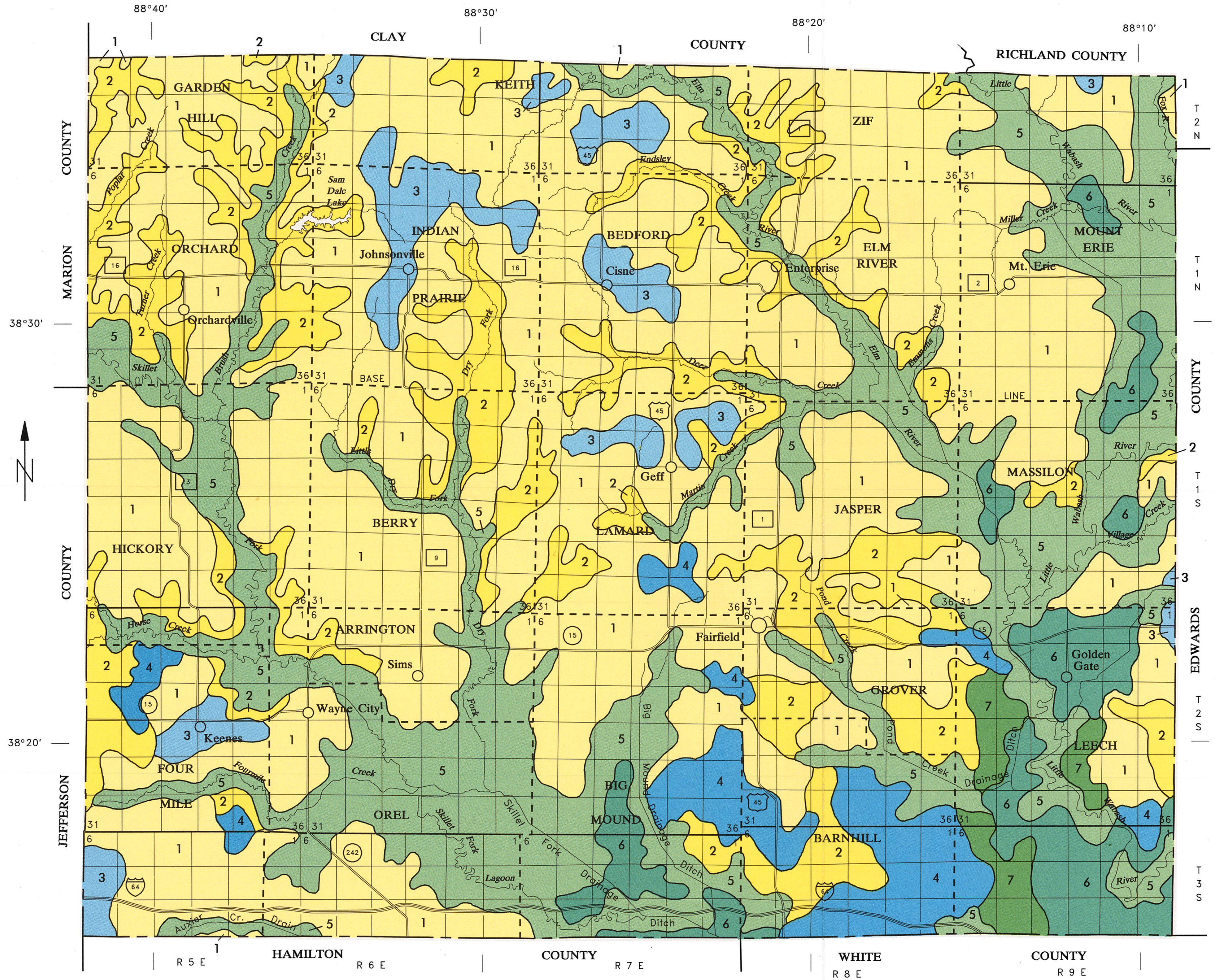


SOIL LEGEND *

1	BLUFORD–WYNOOSE ASSOCIATION
2	AVA–BLAIR–HICKORY ASSOCIATION
3	CISNE–HOYLETON ASSOCIATION
4	ZANESVILLE–GRANTSBURG–FRONDORF ASSOCIATION
5	BONNIE–BELKNAP ASSOCIATION
6	ZIPP–SEXTON–PATTON ASSOCIATION
7	PARKE–NEGLEY ASSOCIATION

*The units on this legend are described in the text under the heading "General Soil Map Units."

Compiled 1993

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
ILLINOIS AGRICULTURAL EXPERIMENT STATION

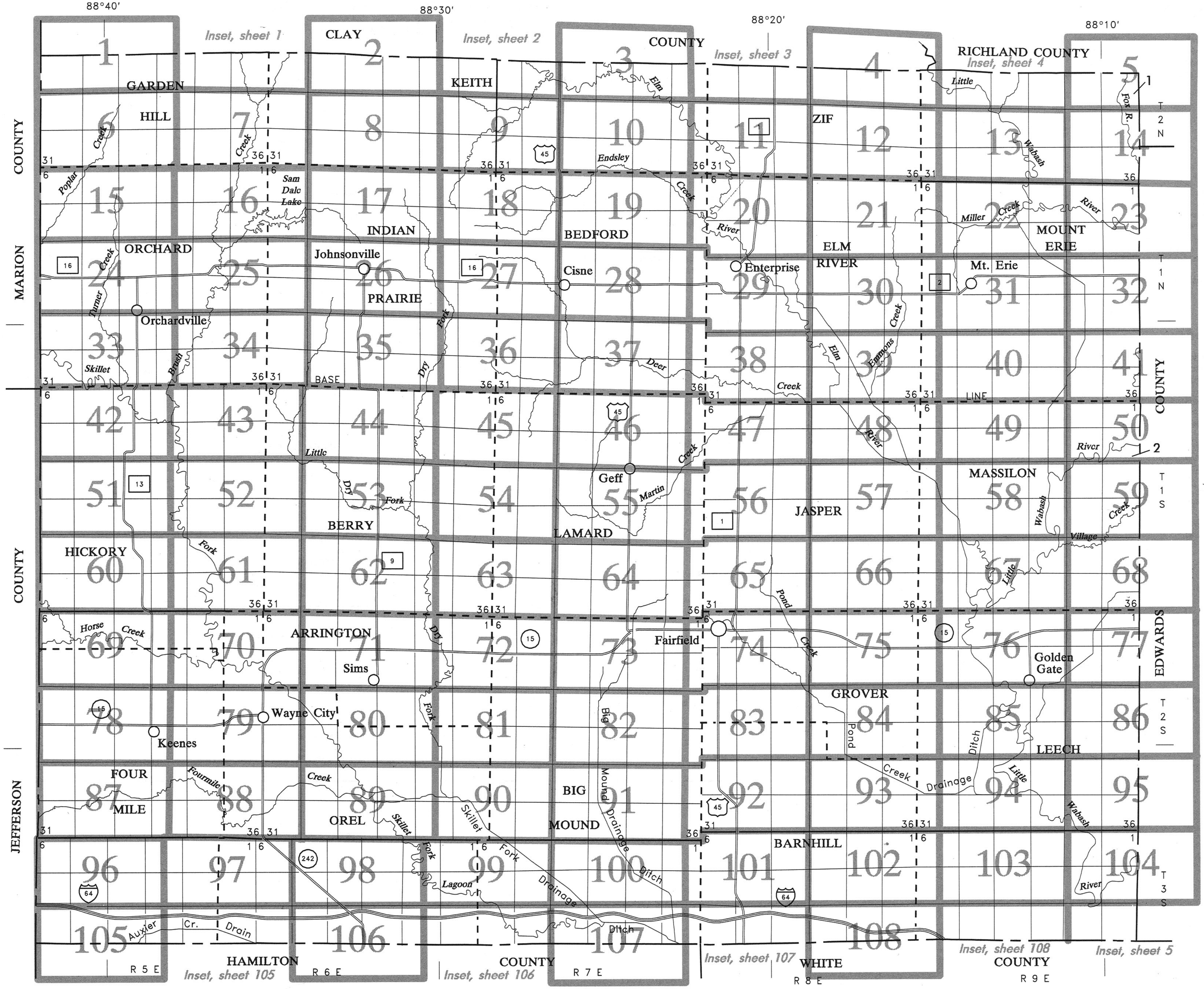
GENERAL SOIL MAP

WAYNE COUNTY, ILLINOIS

Scale 1:190,080

1 0 1 2 3 4 Miles

1 0 4 8 Km



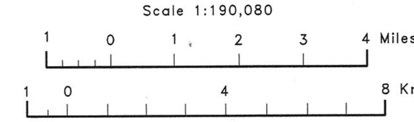
SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

INDEX TO MAP SHEETS

WAYNE COUNTY, ILLINOIS

Scale 1:190,080



SOIL LEGEND

Map symbols consist of numbers or a combination of numbers and letters. The initial numbers represent the kind of soil. A capital letter following those numbers indicates the class of slope. Symbols without a slope letter are for nearly level soils. A final number of 2 following the slope letter indicates that the soil is eroded, and 3 indicates that it is severely eroded.

SYMBOL	NAME
2	Cisne silt loam
3A	Hoyleton silt loam, 0 to 2 percent slopes
3B	Hoyleton silt loam, 2 to 5 percent slopes
5C2	Blair silt loam, 5 to 10 percent slopes, eroded
5C3	Blair silt loam, 5 to 10 percent slopes, severely eroded
7C3	Atlas silty clay loam, 5 to 10 percent slopes, severely eroded
8D2	Hickory silt loam, 10 to 15 percent slopes, eroded
8D3	Hickory silt loam, 10 to 15 percent slopes, severely eroded
8E	Hickory loam, 15 to 20 percent slopes
8E3	Hickory clay loam, 15 to 20 percent slopes, severely eroded
8F	Hickory loam, 20 to 30 percent slopes
12	Wynoose silt loam
13A	Bluford silt loam, 0 to 2 percent slopes
13B	Bluford silt loam, 2 to 5 percent slopes
13B2	Bluford silt loam, 2 to 5 percent slopes, eroded
14B	Ava silt loam, 2 to 5 percent slopes
14B2	Ava silt loam, 2 to 5 percent slopes, eroded
14C2	Ava silt loam, 5 to 10 percent slopes, eroded
14C3	Ava silty clay loam, 5 to 10 percent slopes, severely eroded
15B	Parke silt loam, 2 to 5 percent slopes
15C2	Parke silt loam, 5 to 10 percent slopes, eroded
109	Racoon silt loam
301B	Grantsburg silt loam, 2 to 5 percent slopes
337	Creal silt loam
340C3	Zanesville silt loam, 5 to 10 percent slopes, severely eroded
340D2	Zanesville silt loam, 10 to 15 percent slopes, eroded
340D3	Zanesville silt loam, 10 to 15 percent slopes, severely eroded
432	Geff silt loam
434B	Ridgway silt loam, 2 to 5 percent slopes
585D3	Negley silt loam, 10 to 15 percent slopes, severely eroded
585F	Negley loam, 20 to 45 percent slopes
786E	Frondorf silt loam, 15 to 20 percent slopes
786F	Frondorf silt loam, 20 to 30 percent slopes
1108	Bonnie silt loam, wet
1524	Zipp silty clay loam, wet
3072	Sharon silt loam, frequently flooded
3108	Bonnie silt loam, frequently flooded
3142	Patton silty clay loam, frequently flooded
3208	Sexton silt loam, frequently flooded
3231	Evansville silt loam, frequently flooded
3288	Petrolia silty clay loam, frequently flooded
3382	Belknap silt loam, frequently flooded
3420	Piopolis silty clay loam, frequently flooded
3422	Cape silty clay loam, frequently flooded
3482C2	Uniontown silt loam, frequently flooded, 4 to 10 percent slopes, eroded
3483	Henshaw silt loam, frequently flooded
3524	Zipp silty clay, frequently flooded
3524+	Zipp silt loam, overwash, frequently flooded
3787	Banlic silt loam, frequently flooded
7108	Bonnie silt loam, rarely flooded
7288	Petrolia silty clay loam, rarely flooded
7420	Piopolis silty clay loam, rarely flooded
8382	Belknap silt loam, occasionally flooded
8787	Banlic silt loam, occasionally flooded

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- County
- Reservation (state forest or park)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK
1 890 000 FEET

LAND DIVISION CORNER
(sections and land grants)

ROAD EMBLEM & DESIGNATIONS

- Interstate
- Federal
- State

LEVEES

- Without road

DAMS

- Large (to scale)
- Medium or Small

PITS

- Gravel pit

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Drainage ditch

LAKES, PONDS AND RESERVOIRS

- Perennial
- Intermittent

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS

ESCARPMENTS

- Bedrock (points down slope)

SHORT STEEP SLOPE

SOIL SAMPLE (normally not shown)

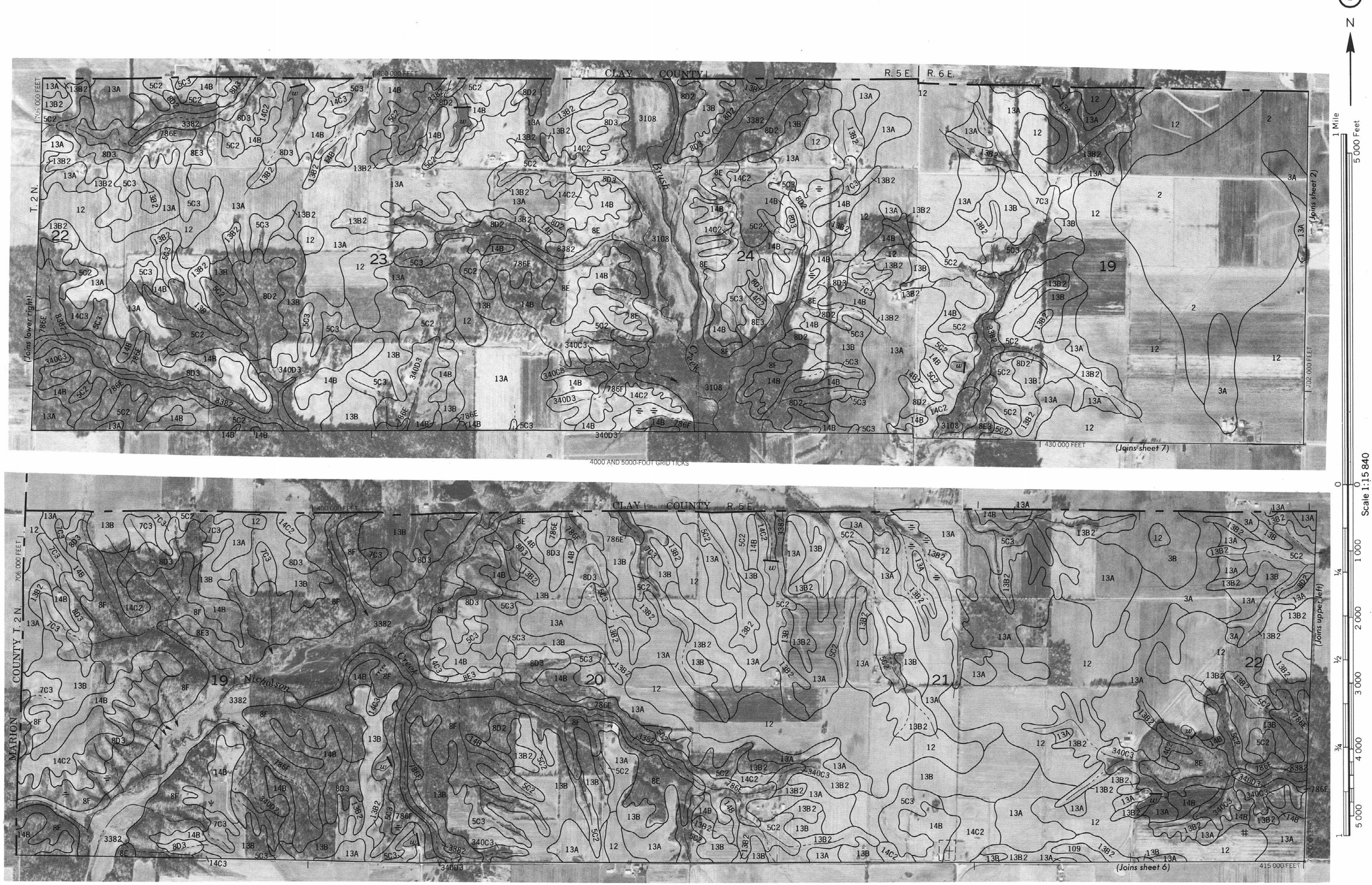
MISCELLANEOUS

- Gumbo, slick or scabby spot (sodic)
- Rock outcrop (includes sandstone and shale)
- Sandy spot
- Severely eroded spot
- Disturbed soil area
- Sandy loam soil spot
- Oil waste land

Miscellaneous symbols represent areas less than 3 acres in size.

WAYNE COUNTY, ILLINOIS NO. 1

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



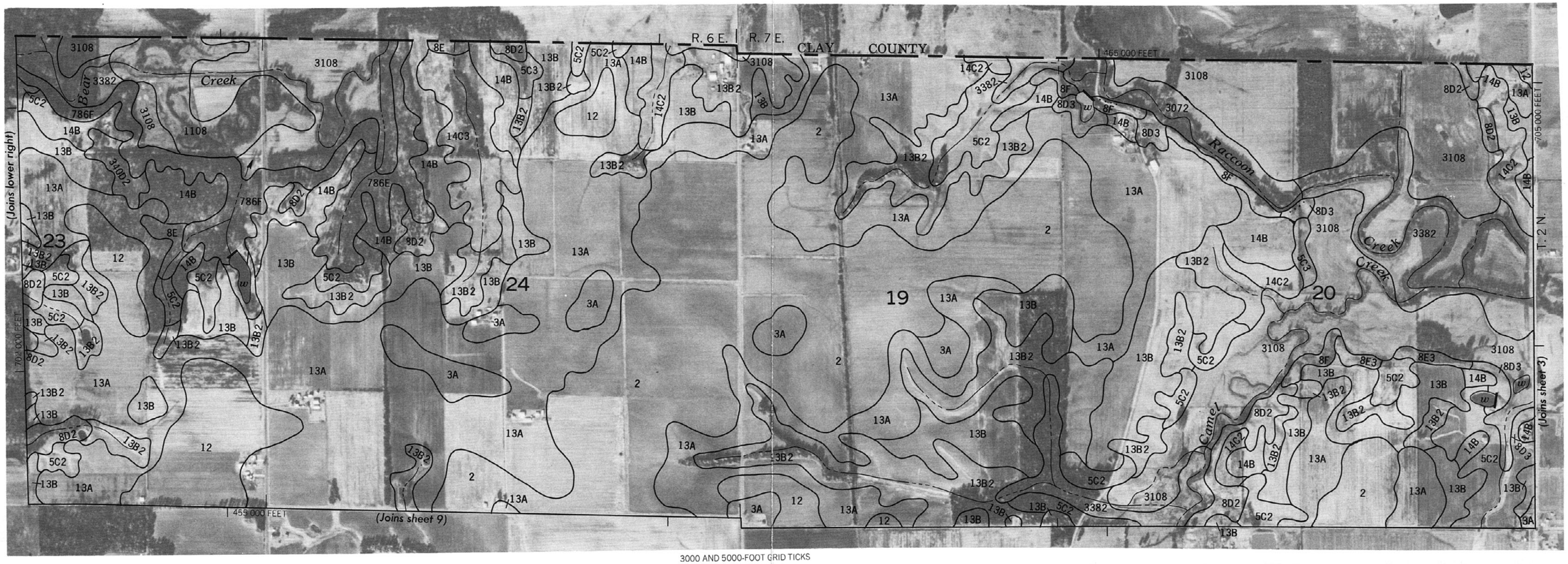
4000 AND 5000-FOOT GRID TICKS

SOIL SURVEY OF WAYNE COUNTY, ILLINOIS — SHEET NUMBER 2

2

N

1 Mile
5 000 Feet
Scale 1:15 840
0 ¼ ½ ¾ 1
0 1 000 2 000 3 000 4 000 5 000



3000 AND 5000-FOOT GRID TICKS

3000 AND 5000-FOOT GRID TICKS

WAYNE COUNTY, ILLINOIS NO. 2

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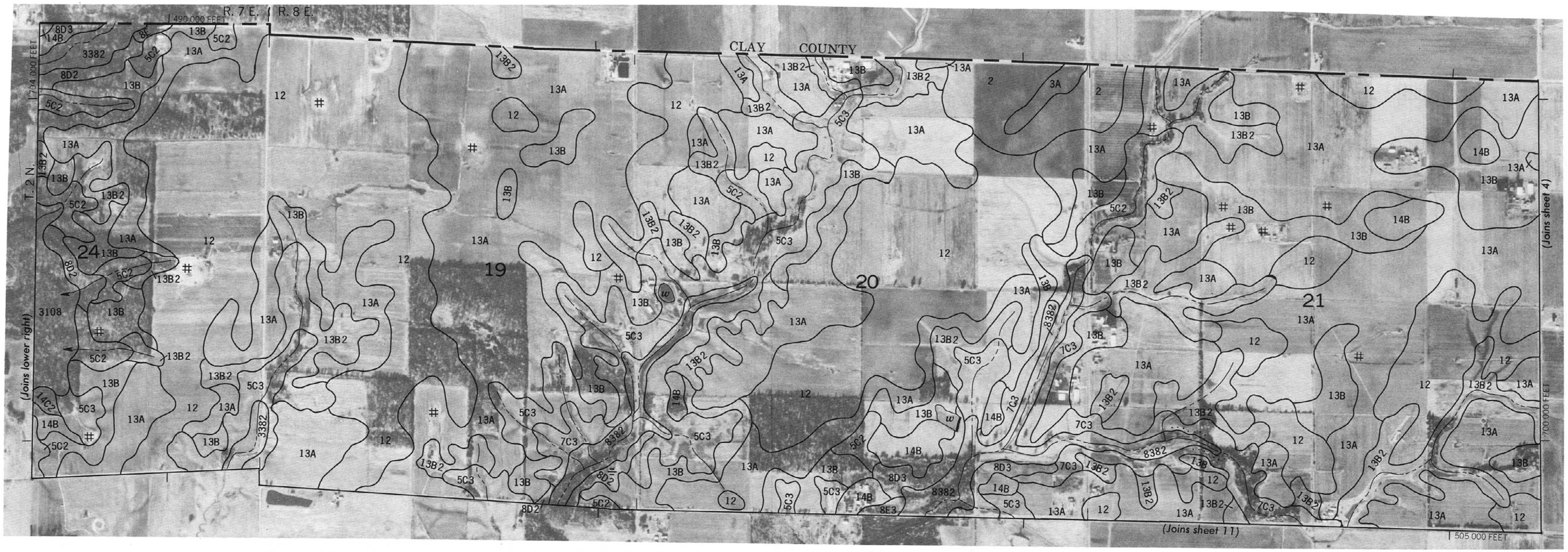
3

N

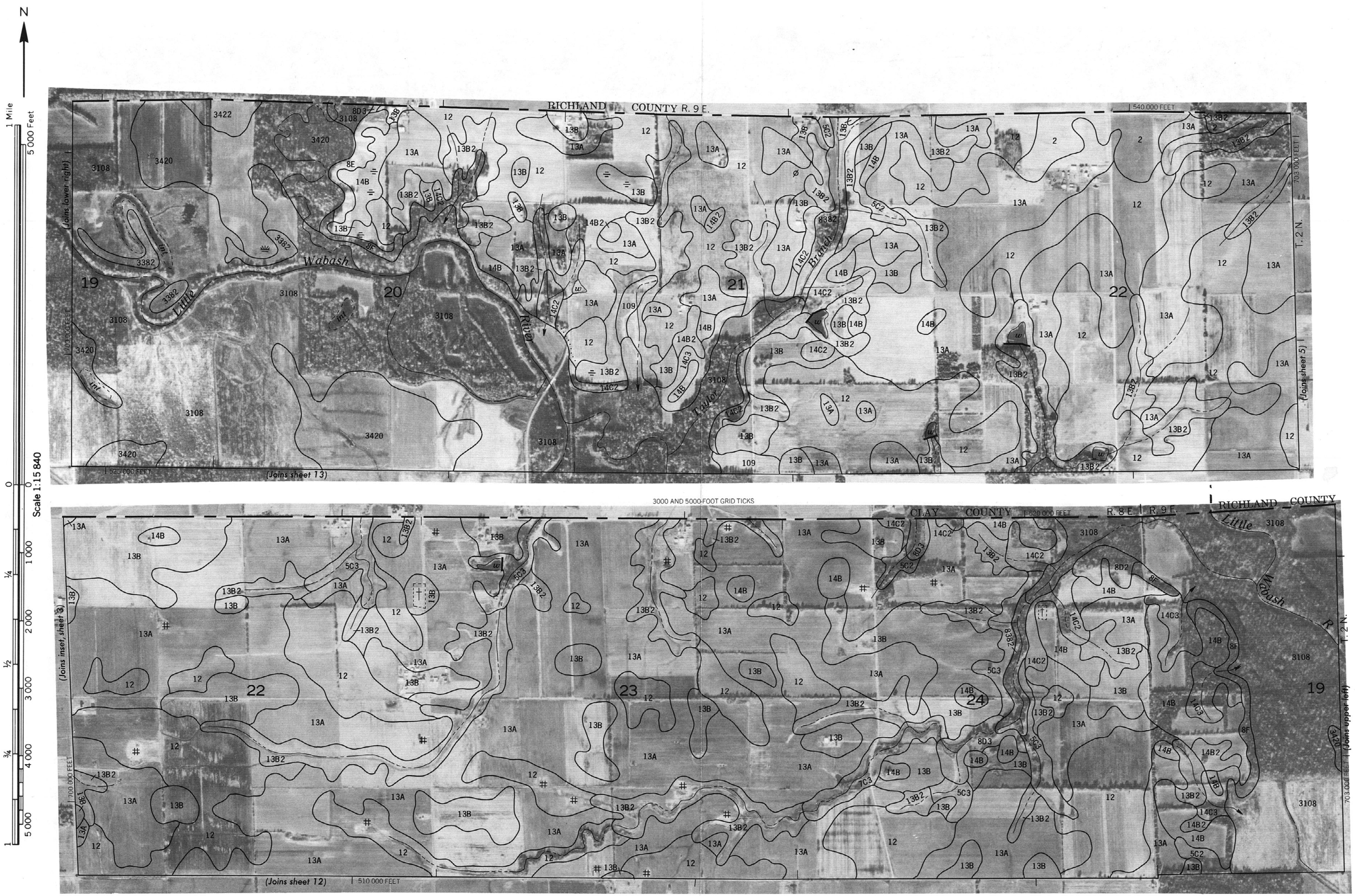


4000 AND 5000-FOOT GRID TICKS

1 Mile
5 000 Feet
0
1 000
¼
2 000
½
3 000
¾
4 000
5 000
1
0
Scale 1:15 840

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 3



WAYNE COUNTY, ILLINOIS NO. 4

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5

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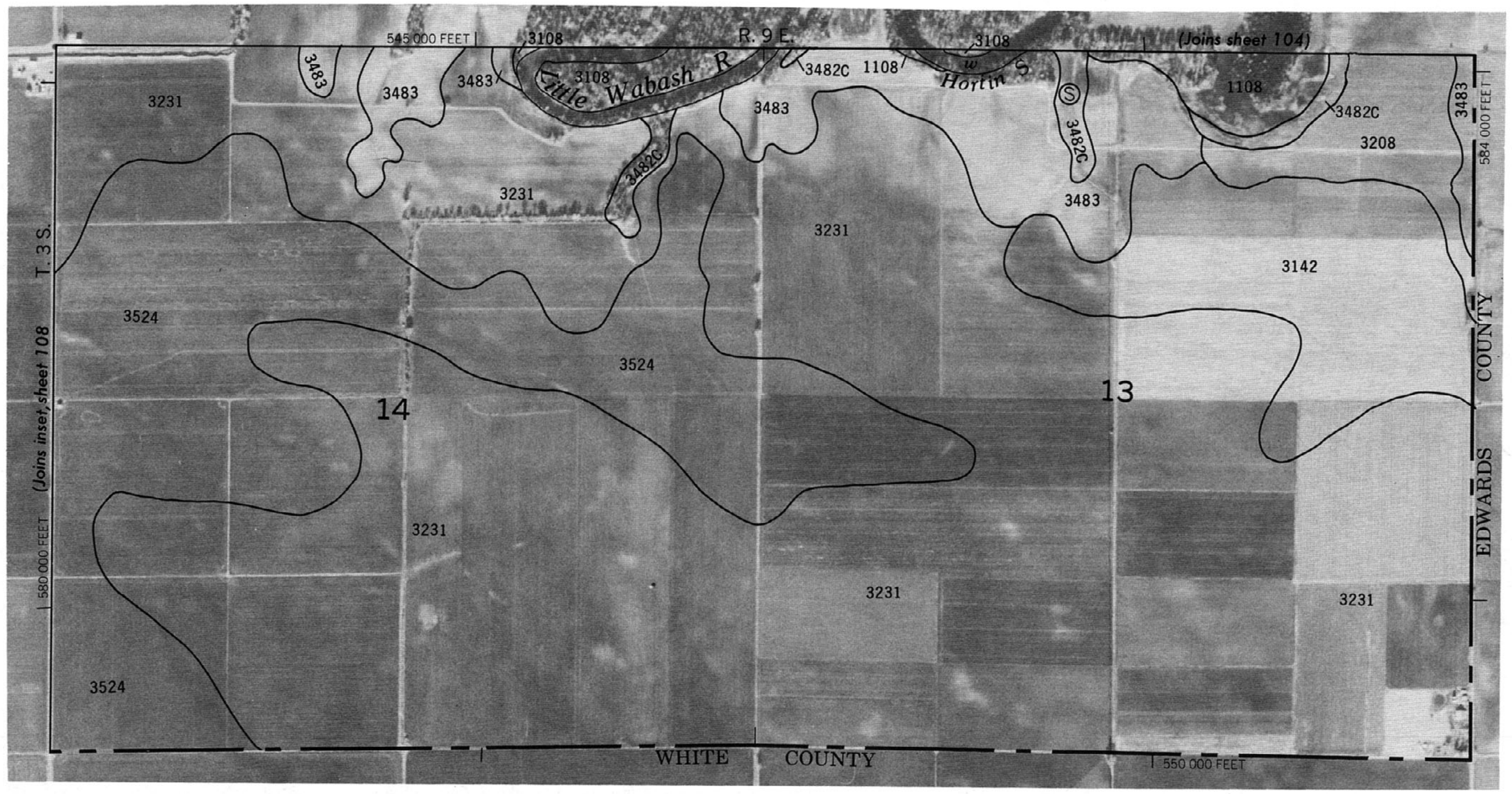
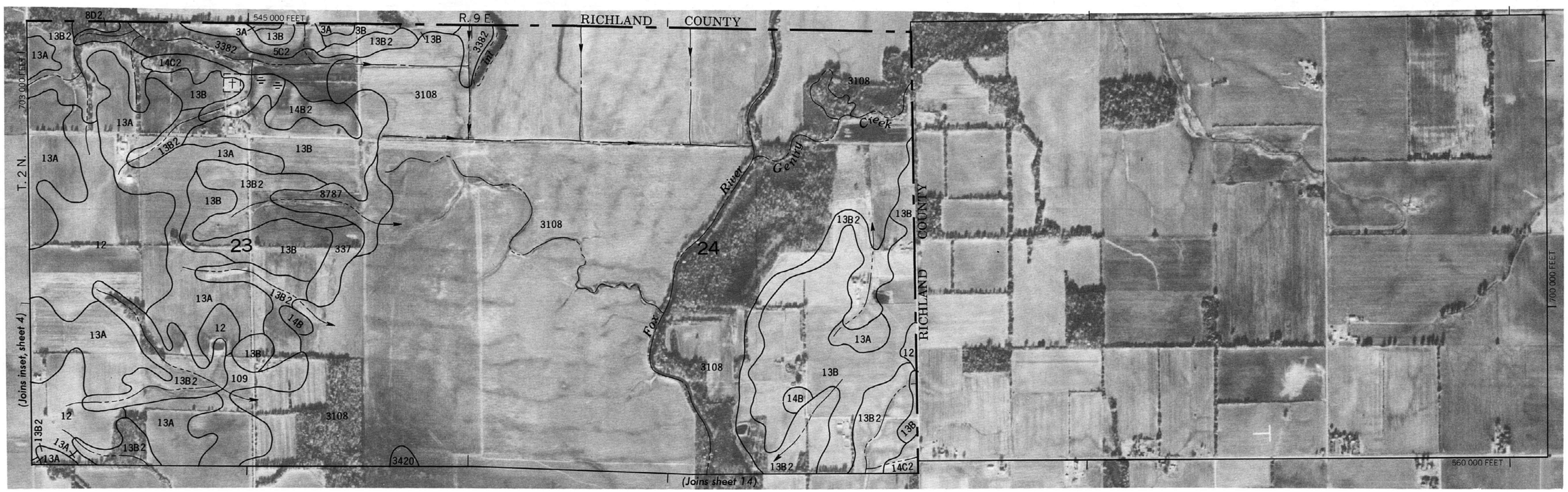
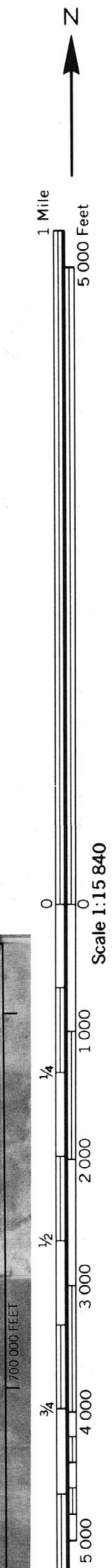
WAYNE COUNTY, ILLINOIS NO. 5



4000 AND 5000-FOOT GRID TICKS





WAYNE COUNTY, ILLINOIS NO. 6

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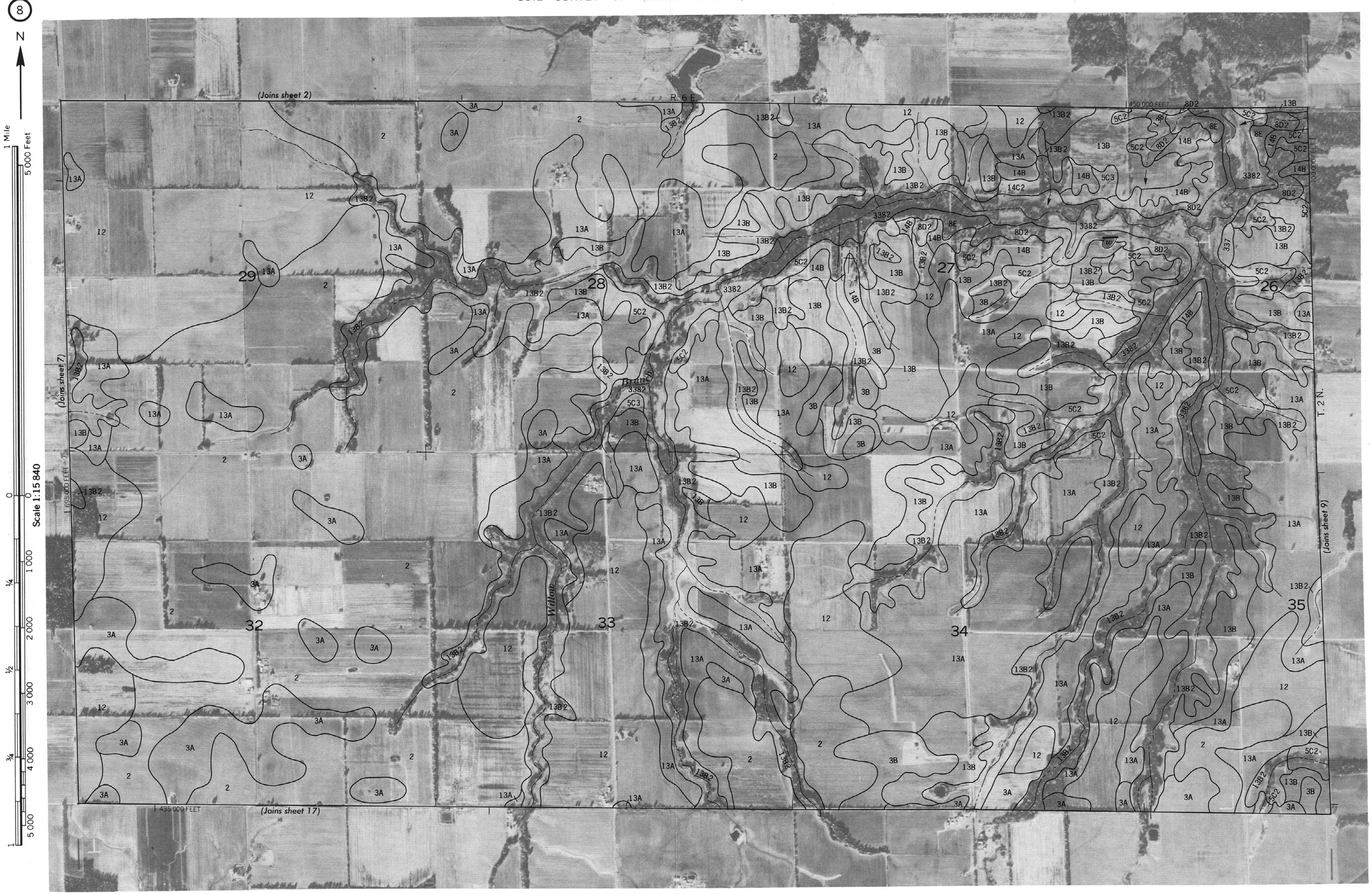
WAYNE COUNTY, ILLINOIS NO. 7



WAYNE COUNTY, ILLINOIS NO. 8

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WAYNE COUNTY, ILLINOIS NO. 9

WAYNE COUNTY, ILLINOIS NO. 10

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N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

WAYNE COUNTY, ILLINOIS NO. 100

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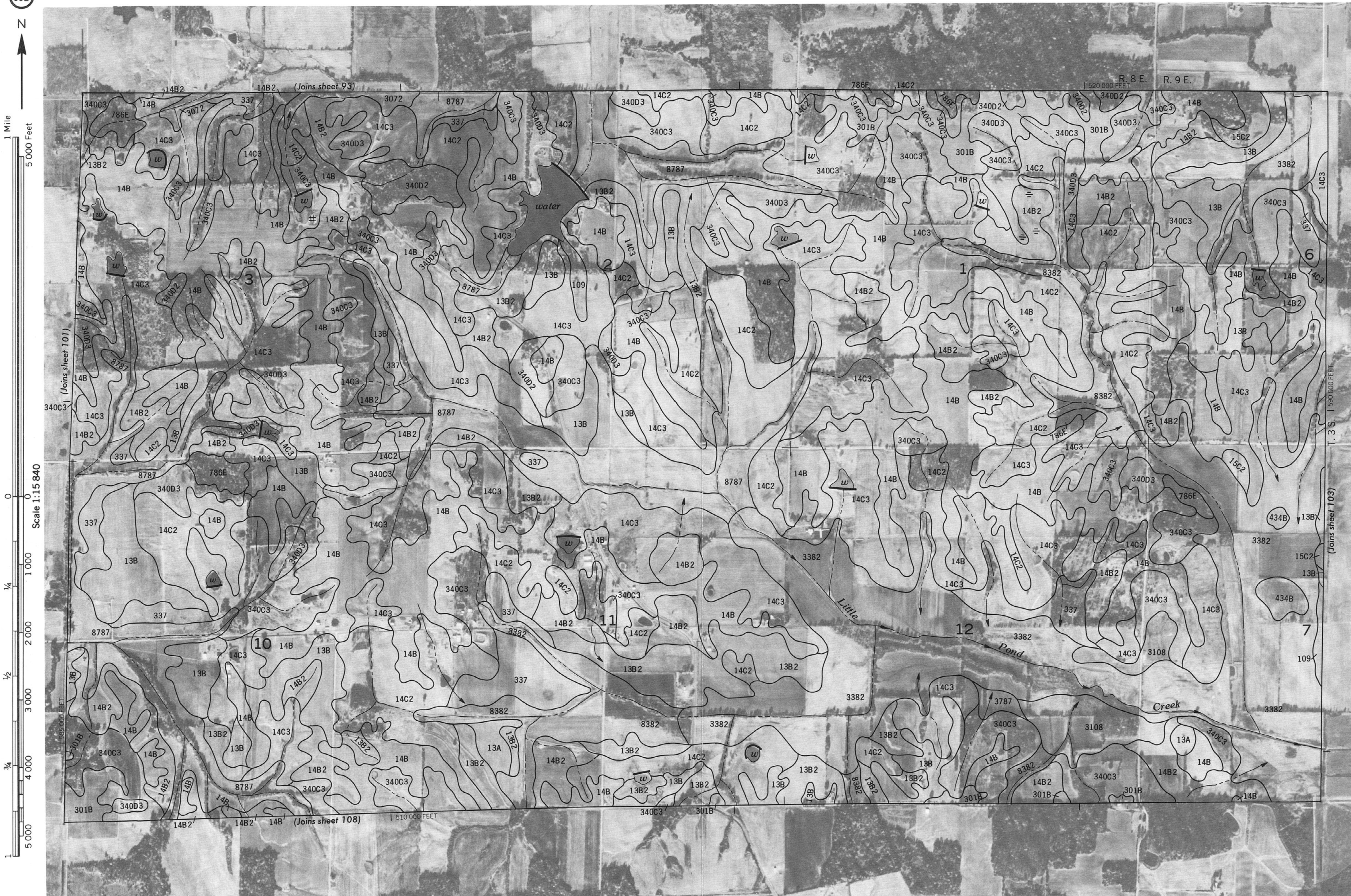
WAYNE COUNTY, ILLINOIS NO. 101



WAYNE COUNTY, ILLINOIS NO. 102

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile

5 000 Feet

Scale 1:15 840

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

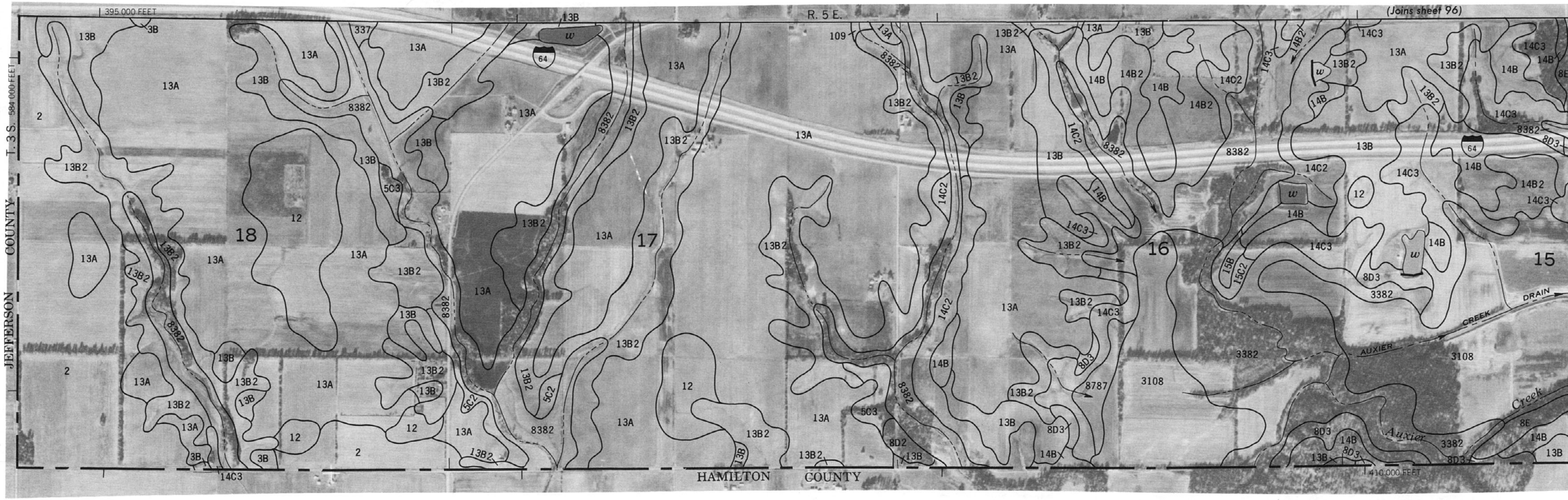
WAYNE COUNTY, ILLINOIS NO. 103

WAYNE COUNTY, ILLINOIS NO. 104

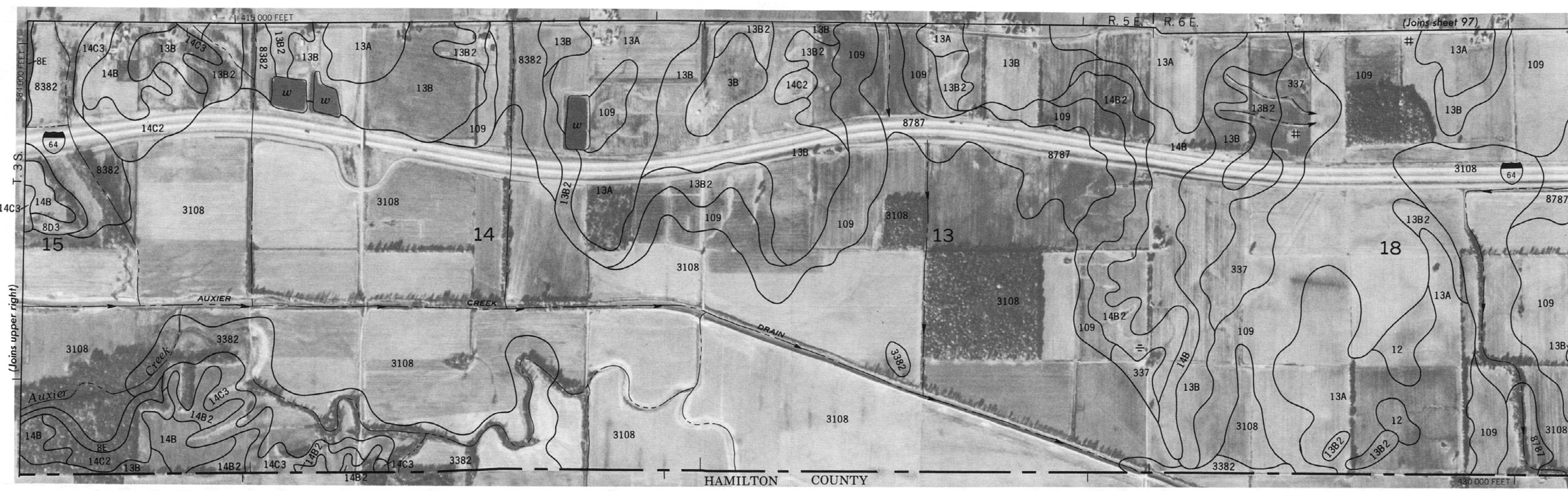
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(105)

N



4000 AND 5000-FOOT GRID TICKS



4000 AND 5000-FOOT GRID TICKS

1 Mile — 5 000 Feet — Scale 1:15 840

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 105

SOIL SURVEY OF WAYNE COUNTY, ILLINOIS — SHEET NUMBER 106

N

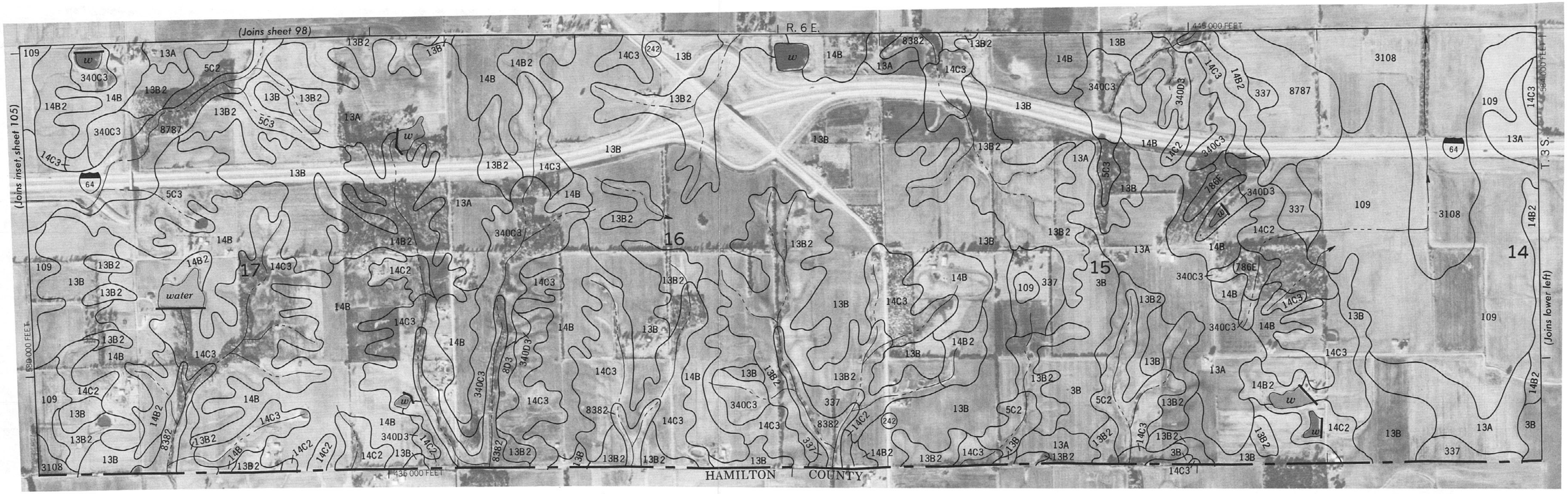
1 Mile

5 000 Feet

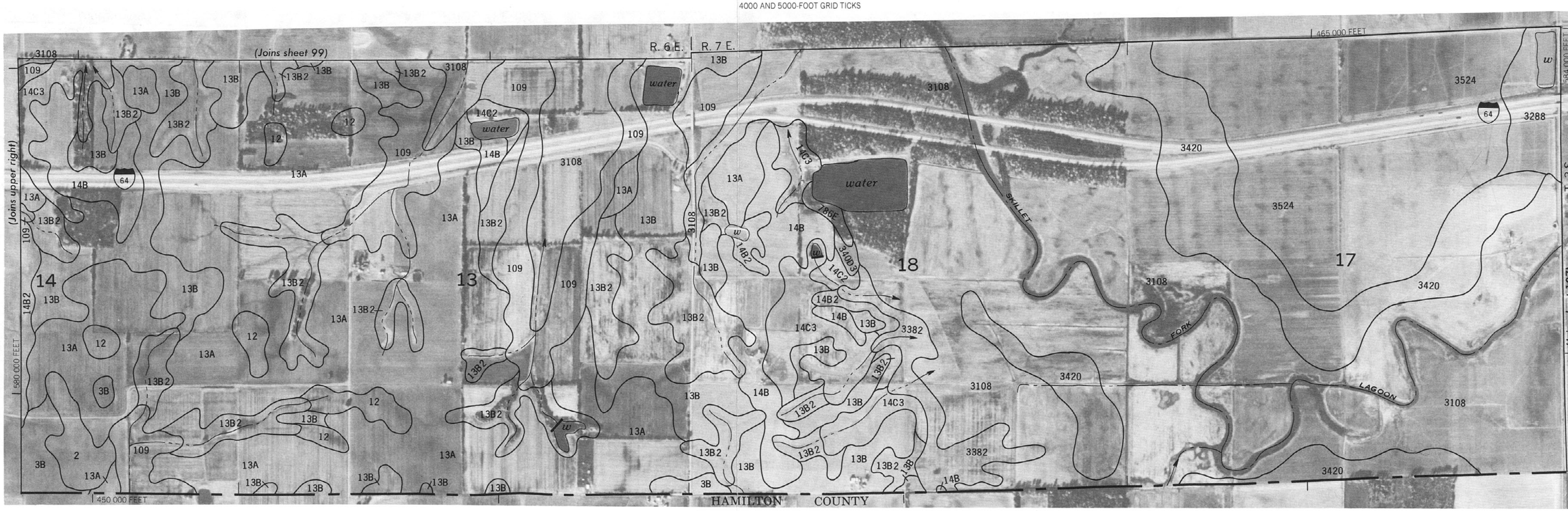
Scale 1:15 840

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000



4000 AND 5000-FOOT GRID TICKS



WAYNE COUNTY, ILLINOIS NO. 106

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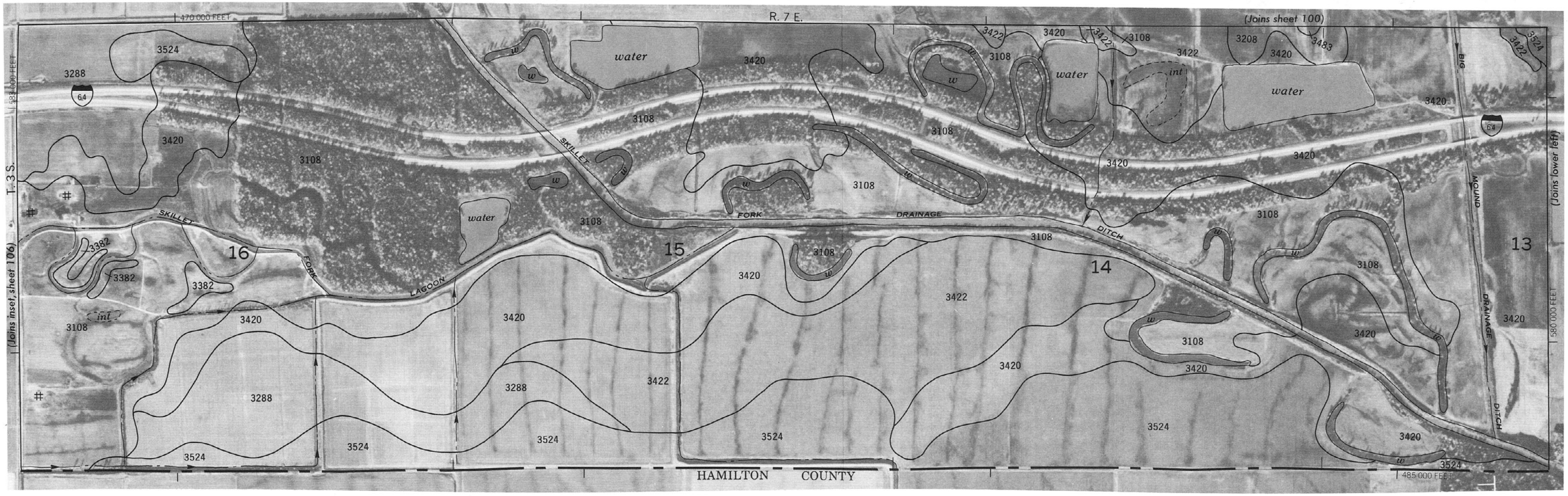
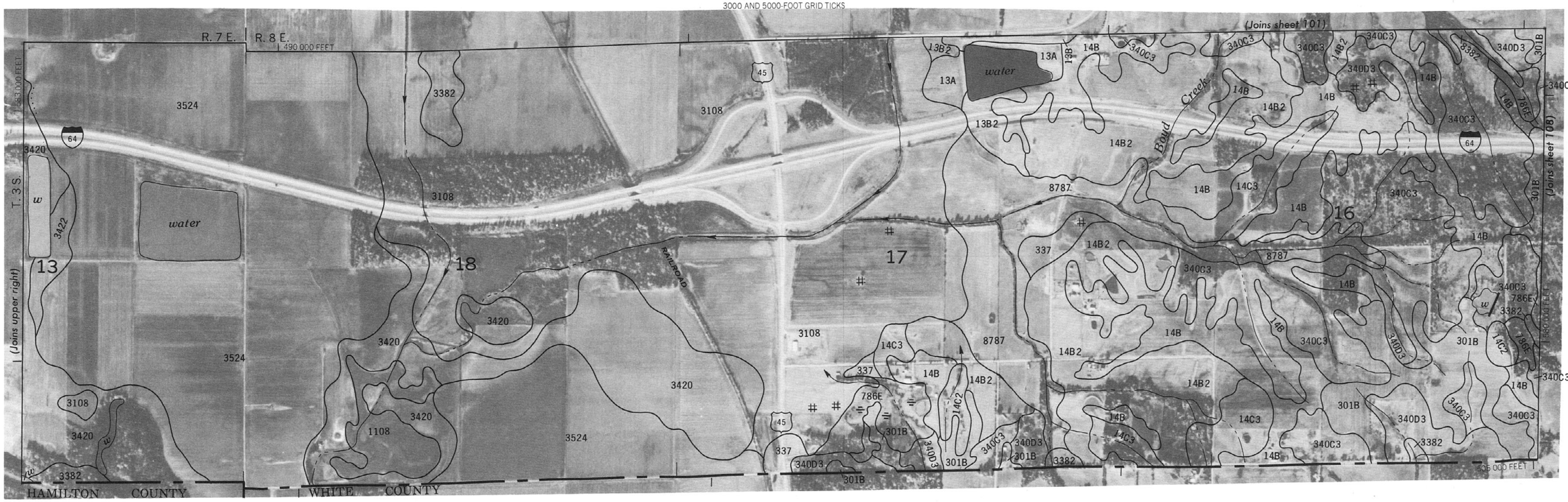
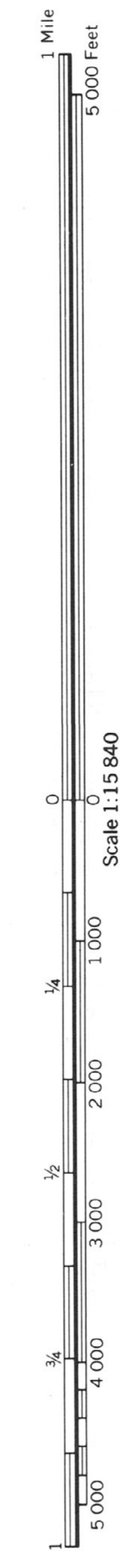
107

N



3000 AND 5000-FOOT GRID TICKS





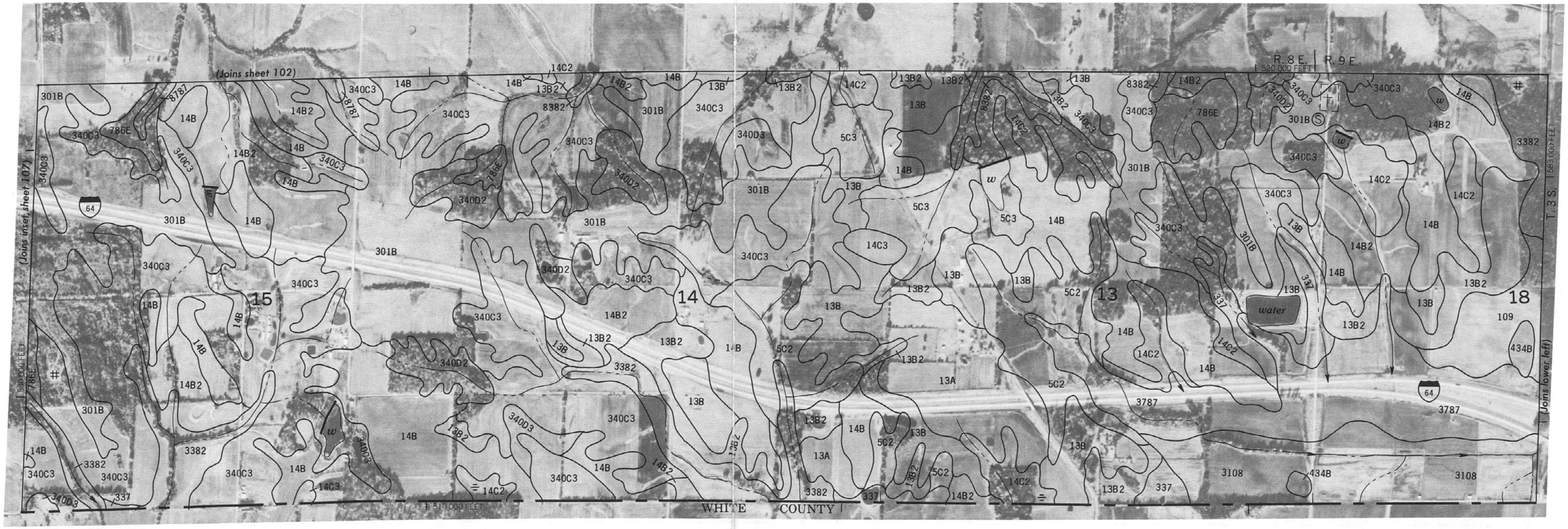
WAYNE COUNTY, ILLINOIS NO. 107

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

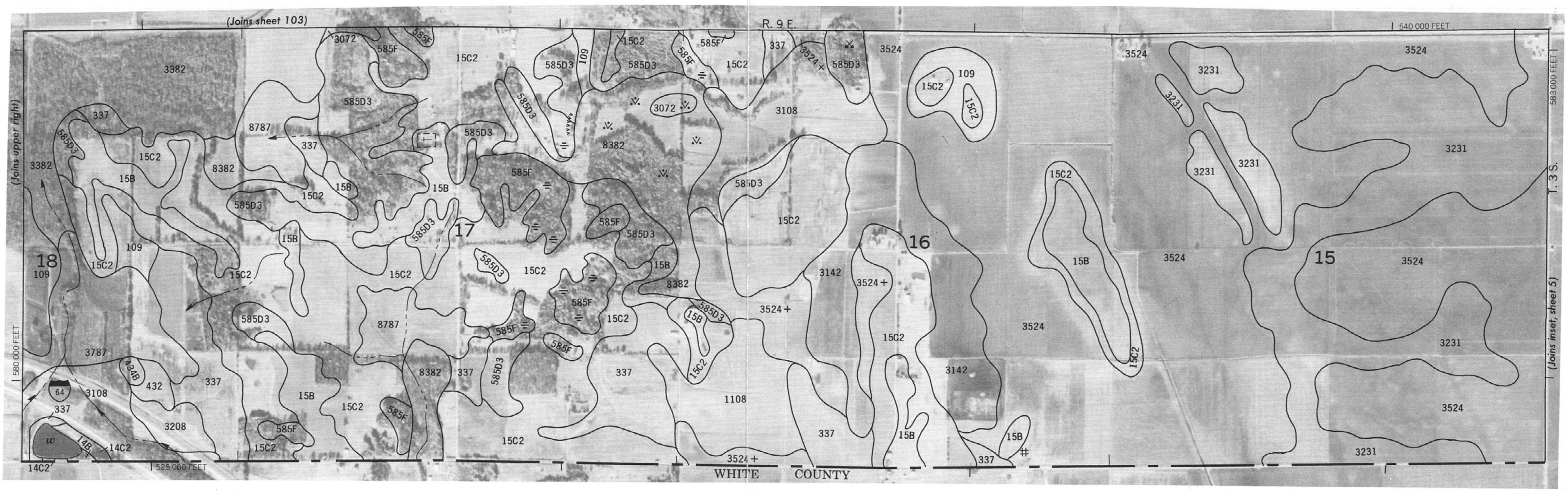
SOIL SURVEY OF WAYNE COUNTY, ILLINOIS — SHEET NUMBER 108

N

Scale 1:15 840



3000 AND 5000-FOOT GRID TICKS

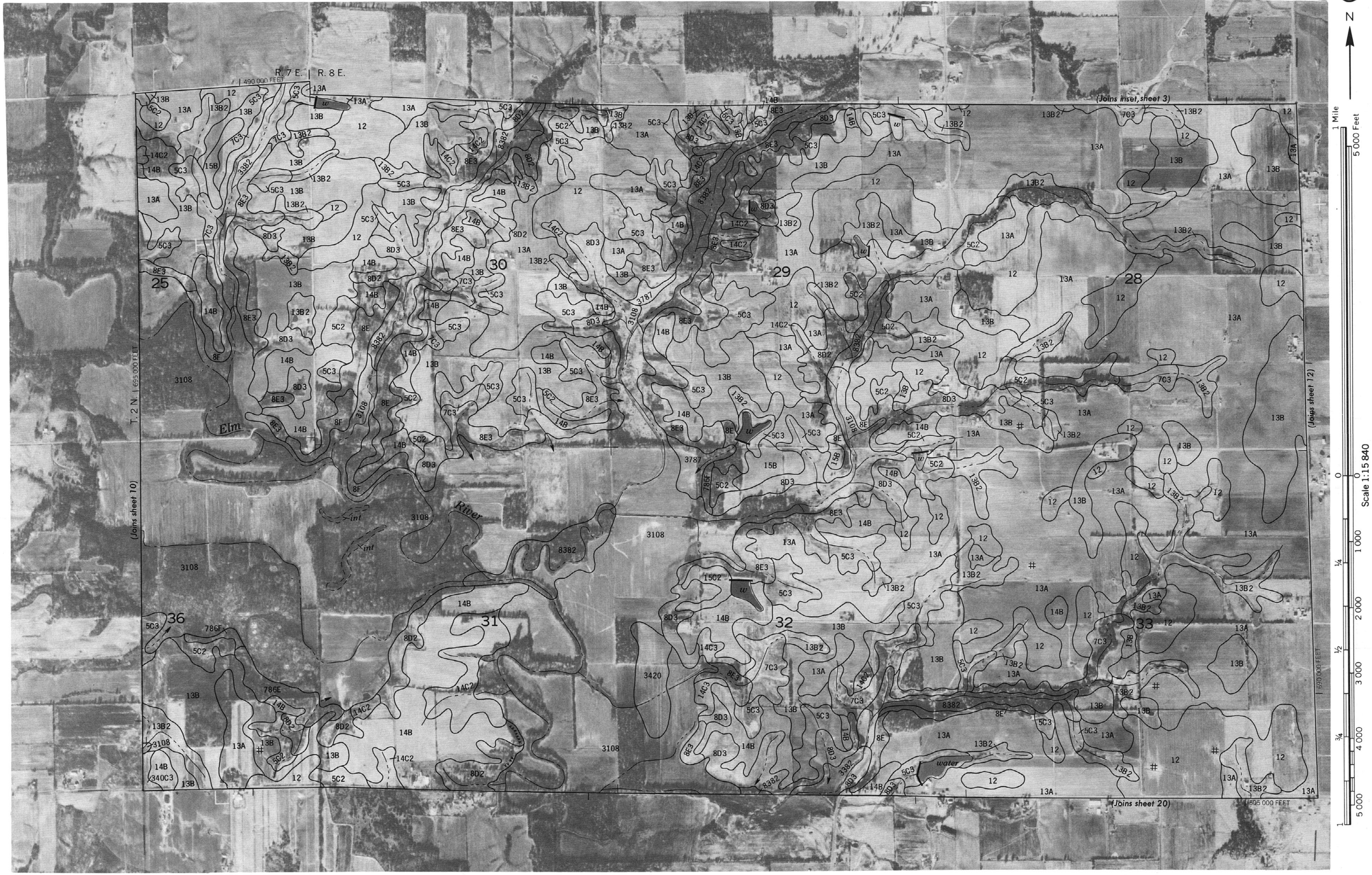


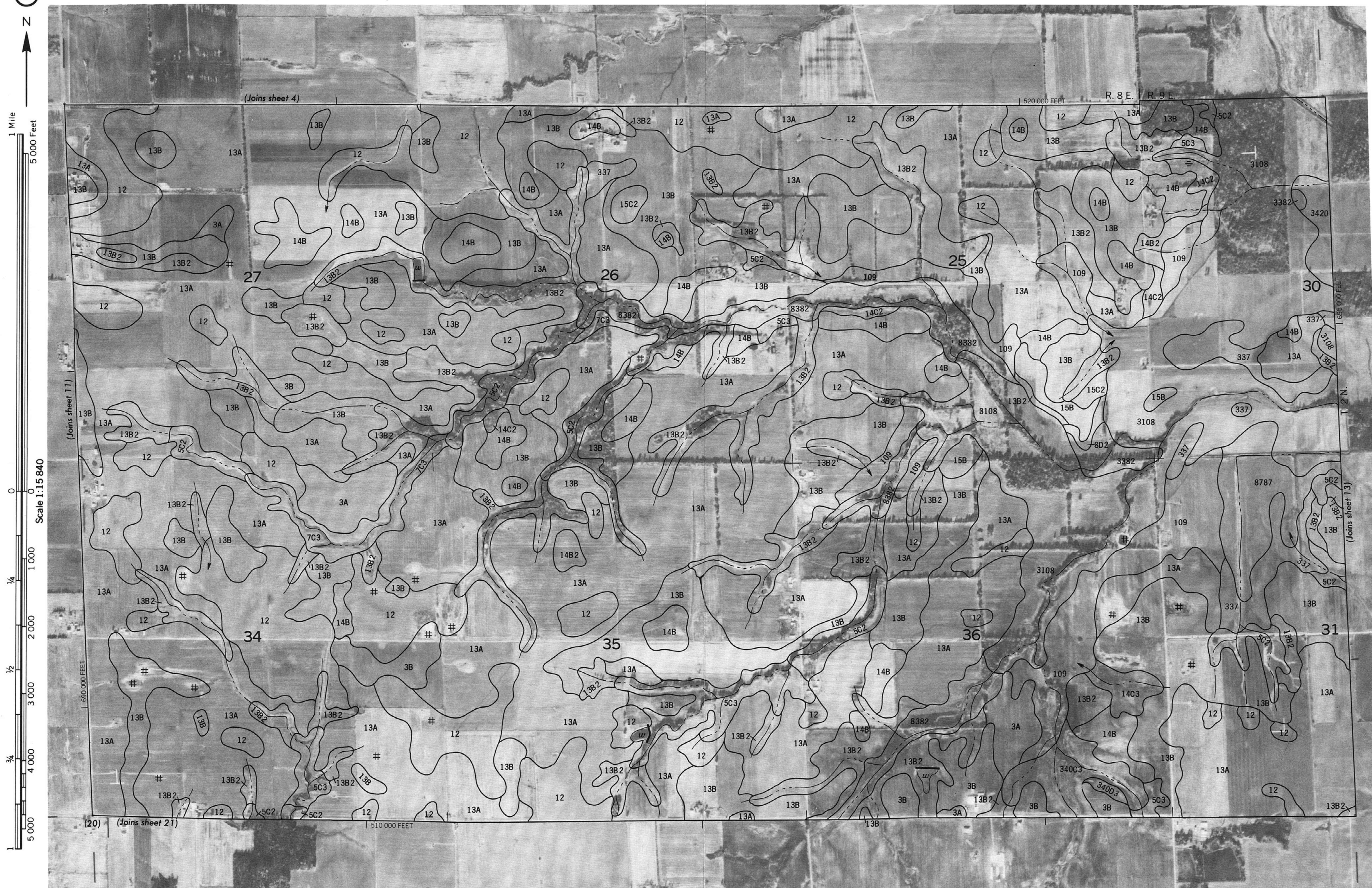
WAYNE COUNTY, ILLINOIS NO. 108

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. County grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 11





WAYNE COUNTY, ILLINOIS NO. 12

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 13

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 14

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(15)

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 15

16

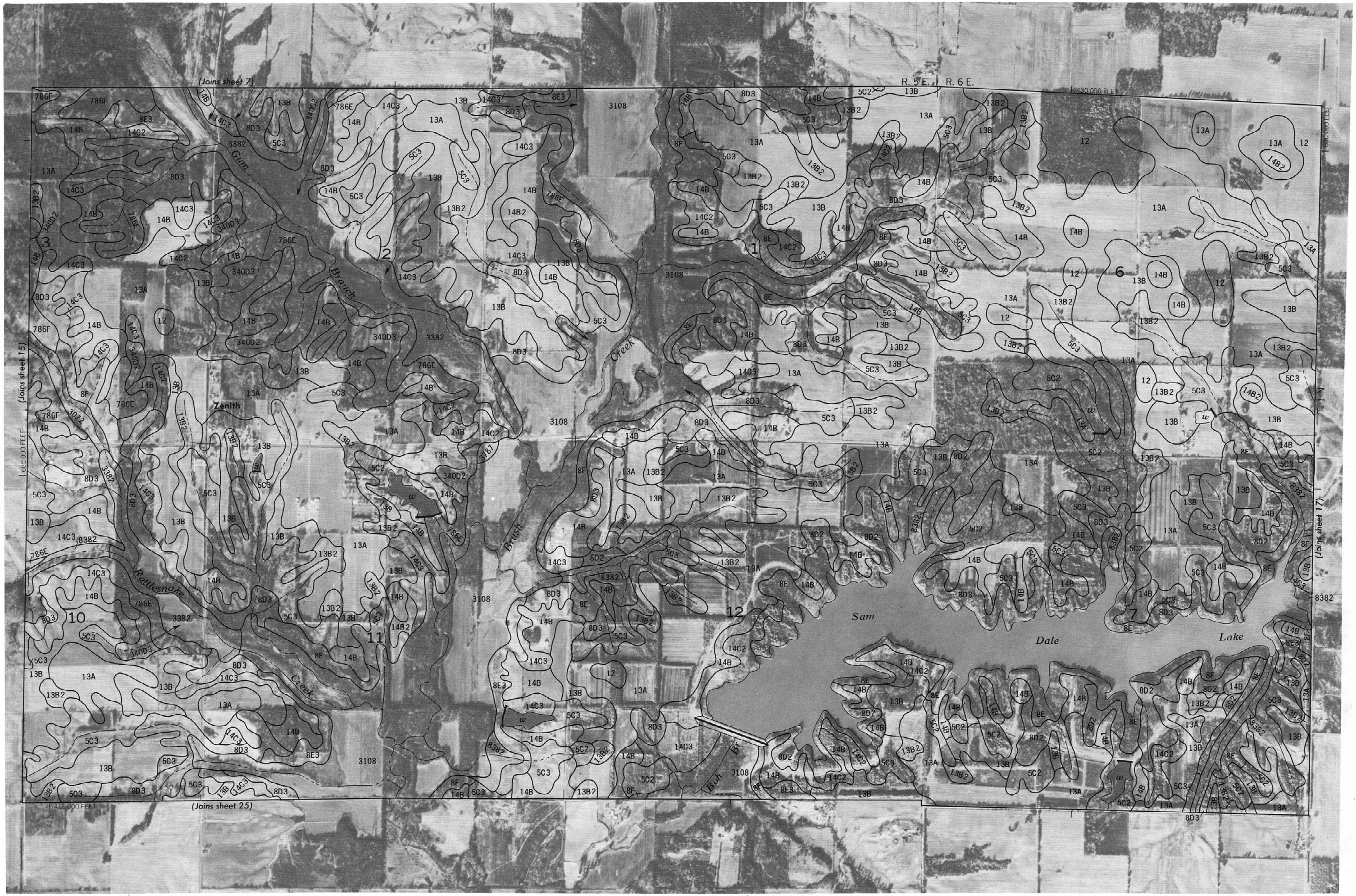
N

1 Mile
5 000 Feet

Scale 1:15 840

0 — 1/4 — 1/2 — 3/4 — 1

0 — 1 000 — 2 000 — 3 000 — 4 000 — 5 000



WAYNE COUNTY, ILLINOIS NO. 16

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 17

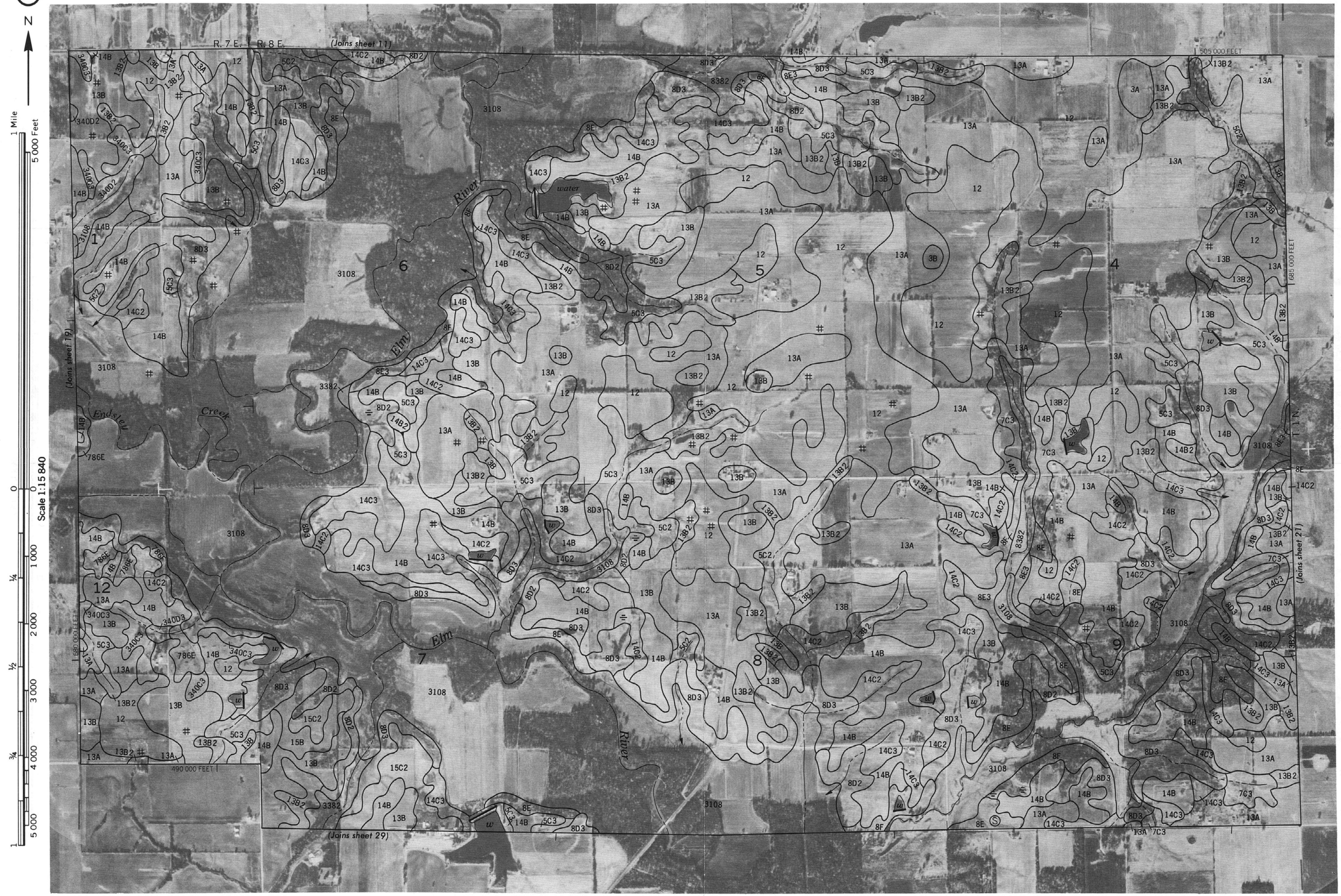
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 18

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are reproduced from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 19



WAYNE COUNTY, ILLINOIS NO. 20

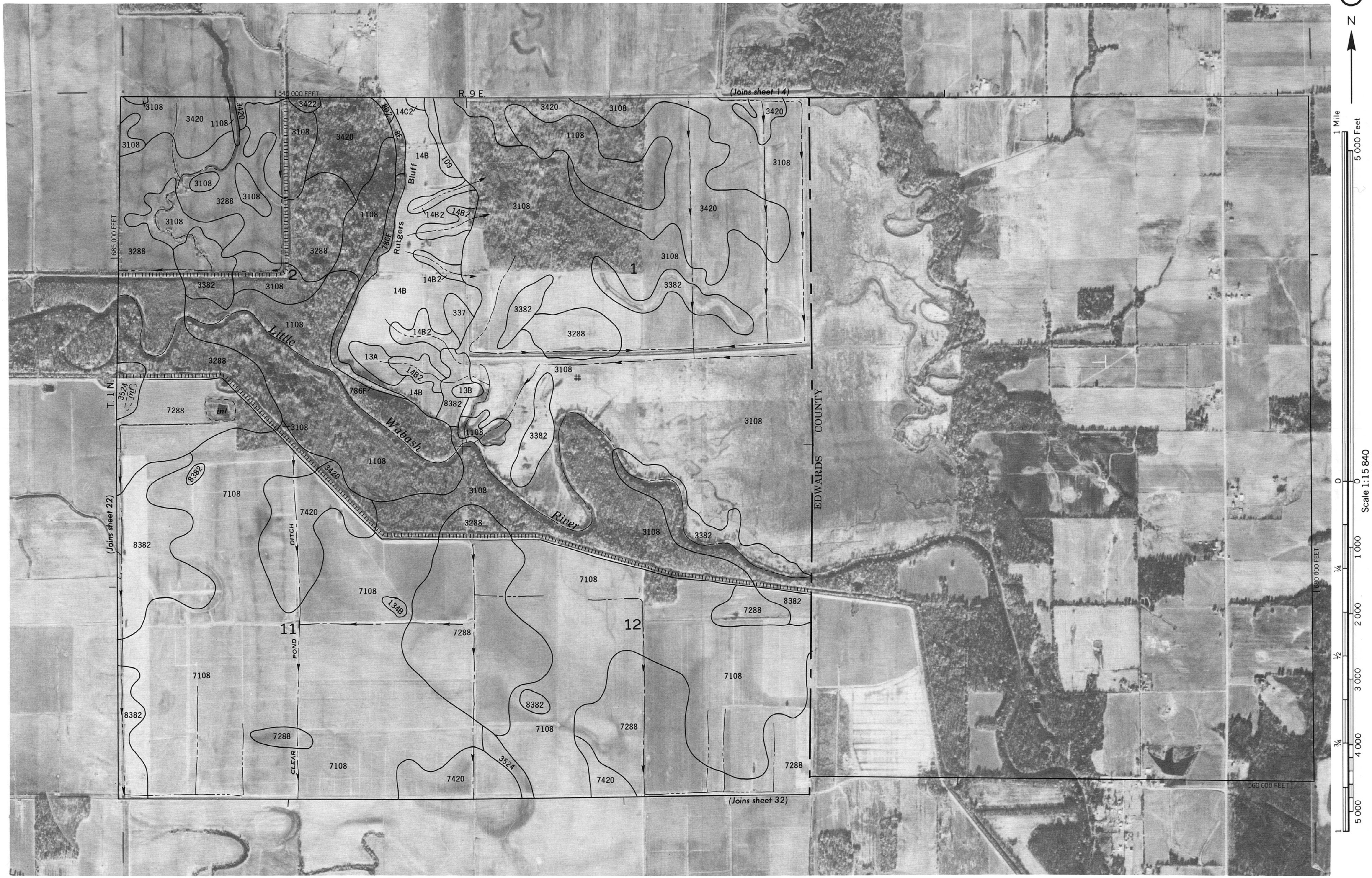
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 21

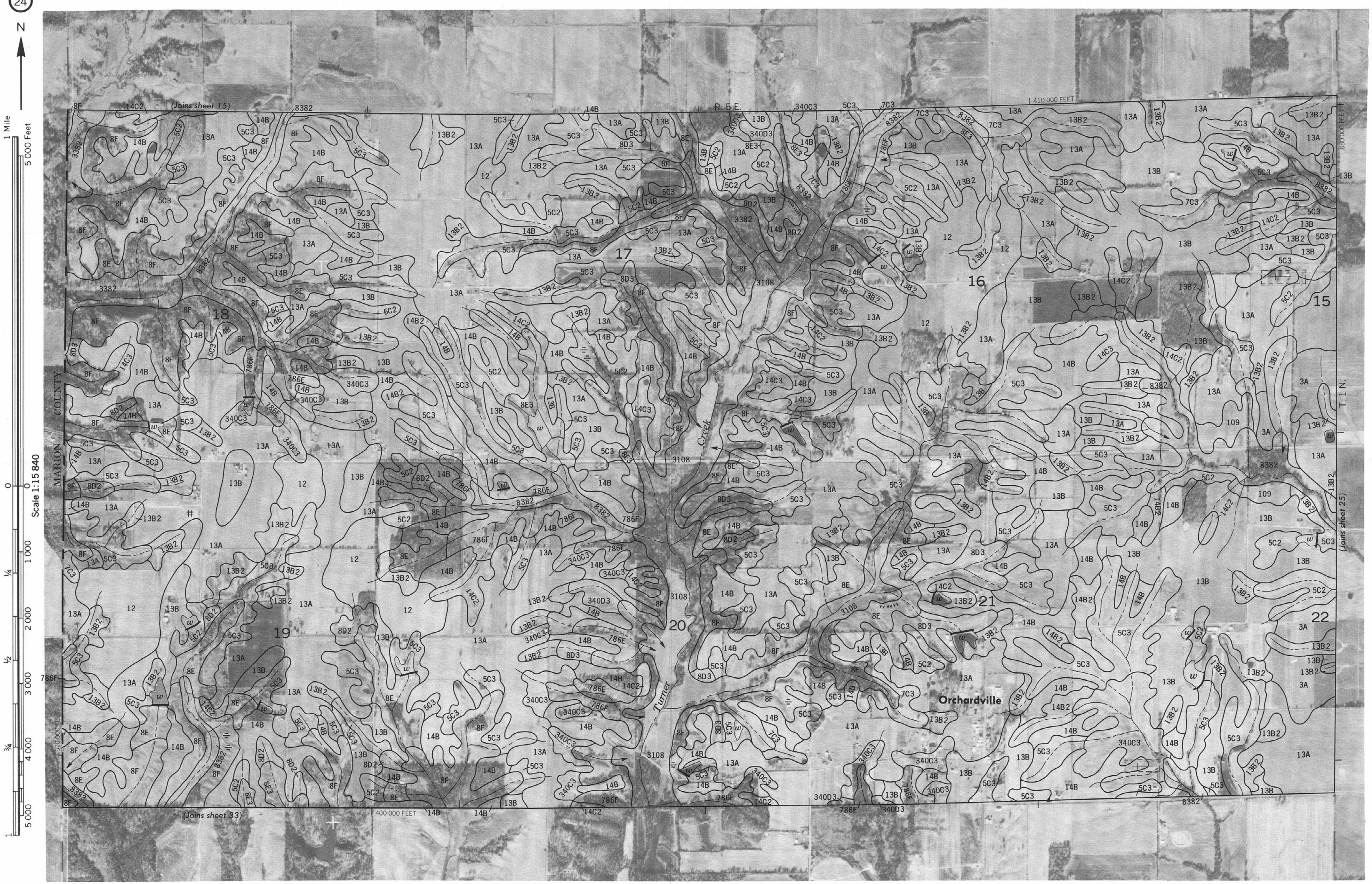
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 22

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



WAYNE COUNTY, ILLINOIS NO. 24

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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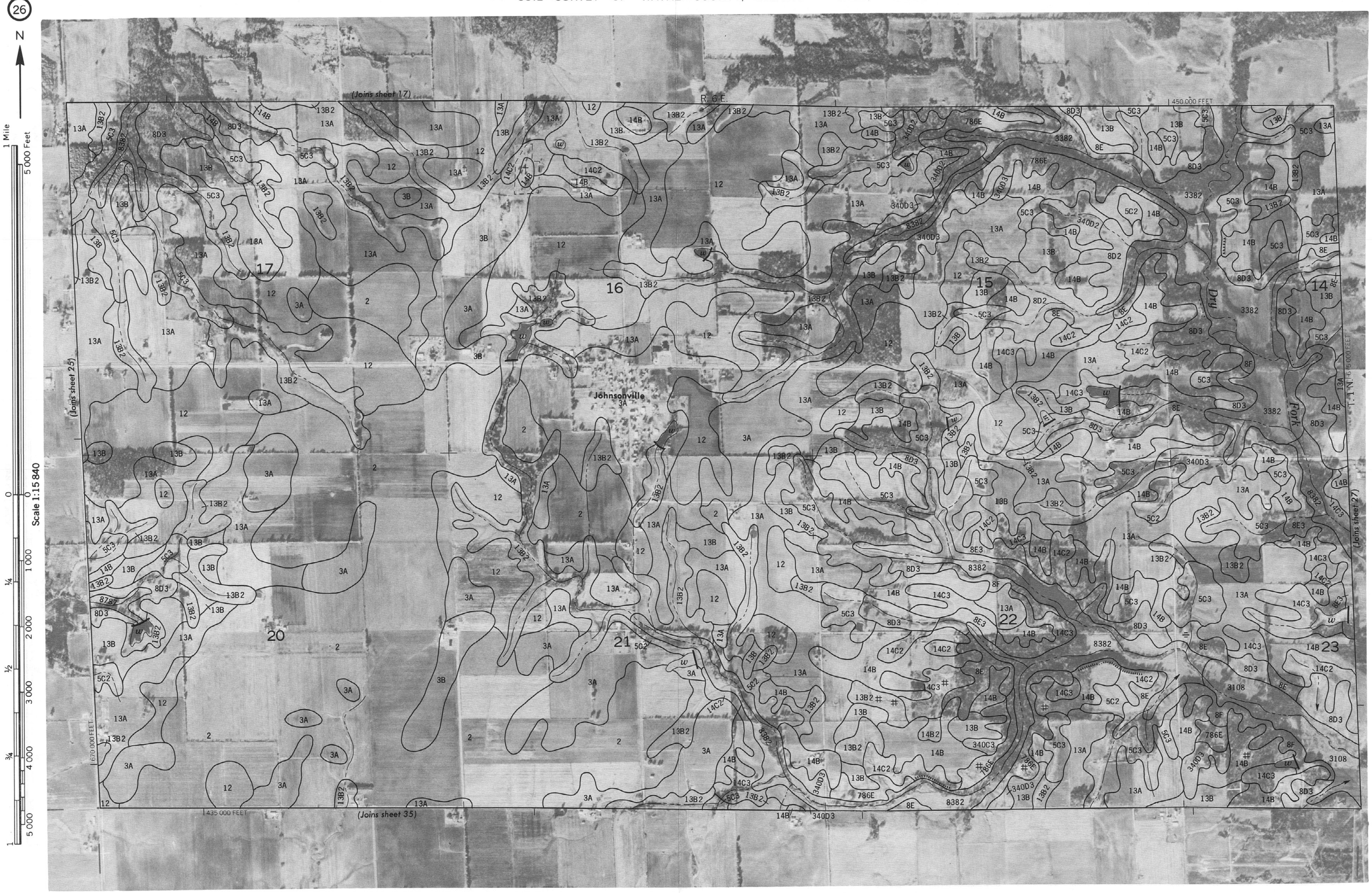
WAYNE COUNTY, ILLINOIS NO. 25



WAYNE COUNTY, ILLINOIS NO. 26

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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WAYNE COUNTY, ILLINOIS NO. 27

WAYNE COUNTY, ILLINOIS NO. 28

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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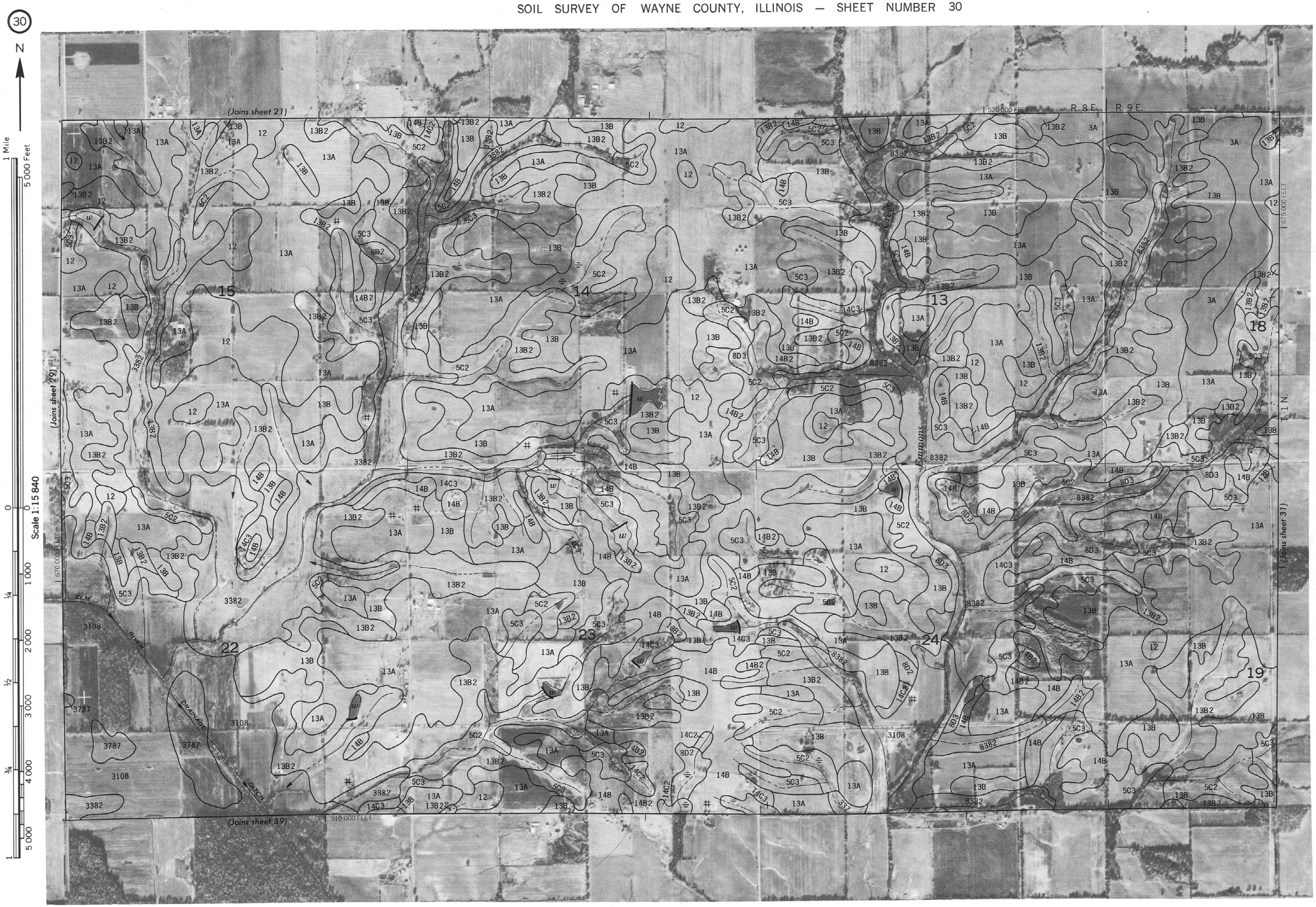
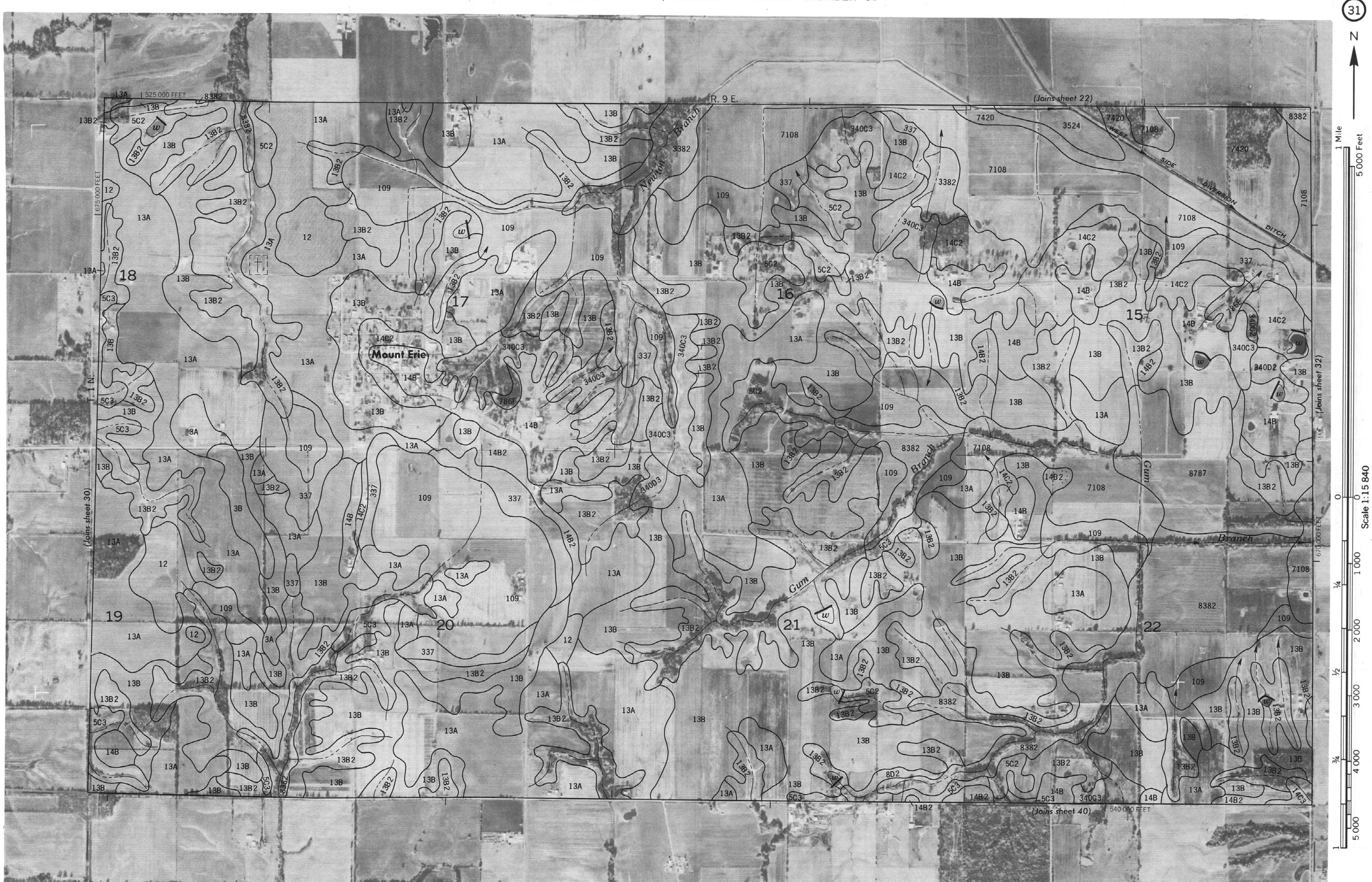
WAYNE COUNTY, ILLINOIS NO. 29



WAYNE COUNTY, ILLINOIS NO. 30

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



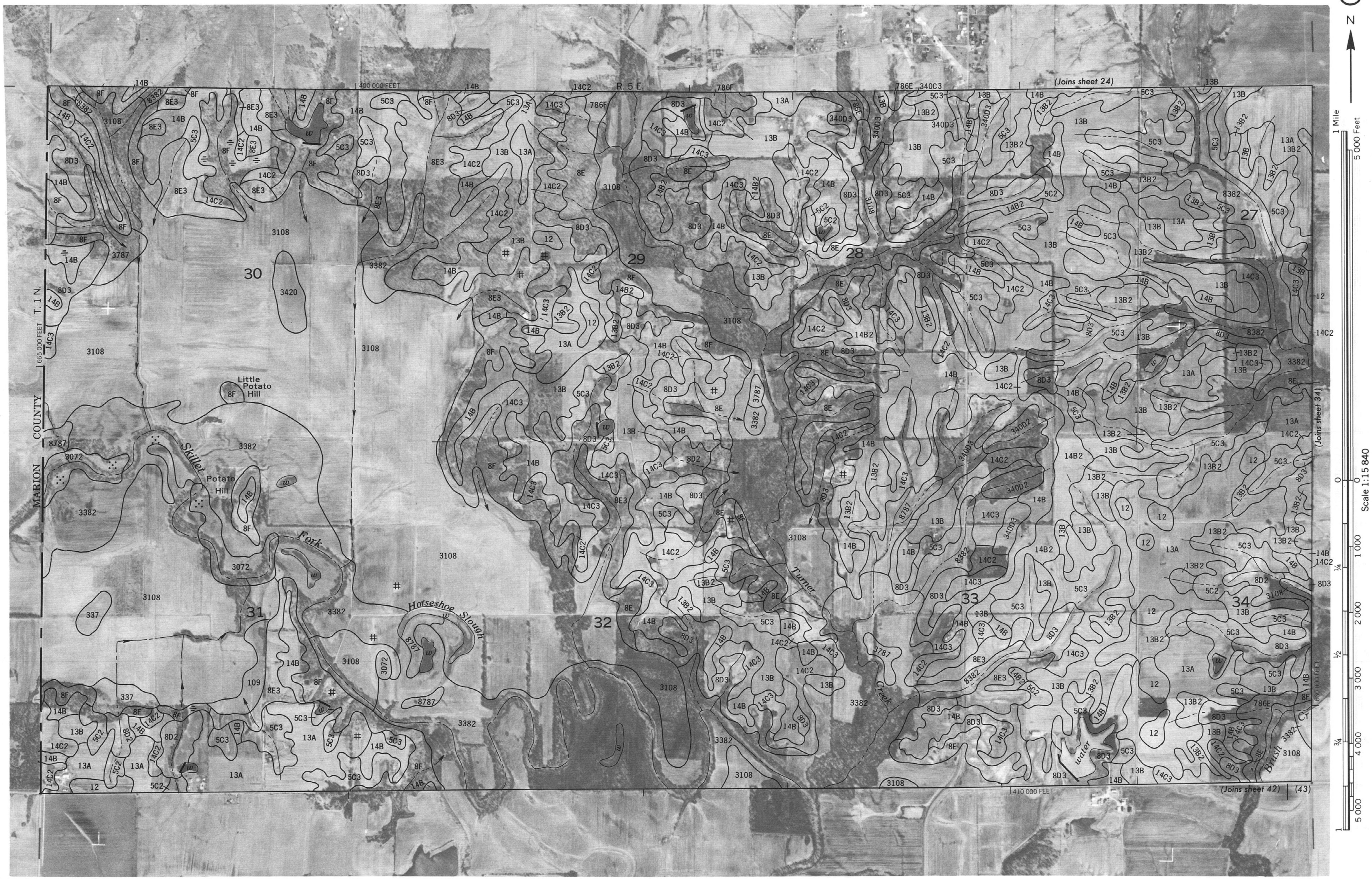
WAYNE COUNTY, ILLINOIS NO. 31

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL SURVEY OF WAYNE COUNTY, ILLINOIS — SHEET NUMBER 32

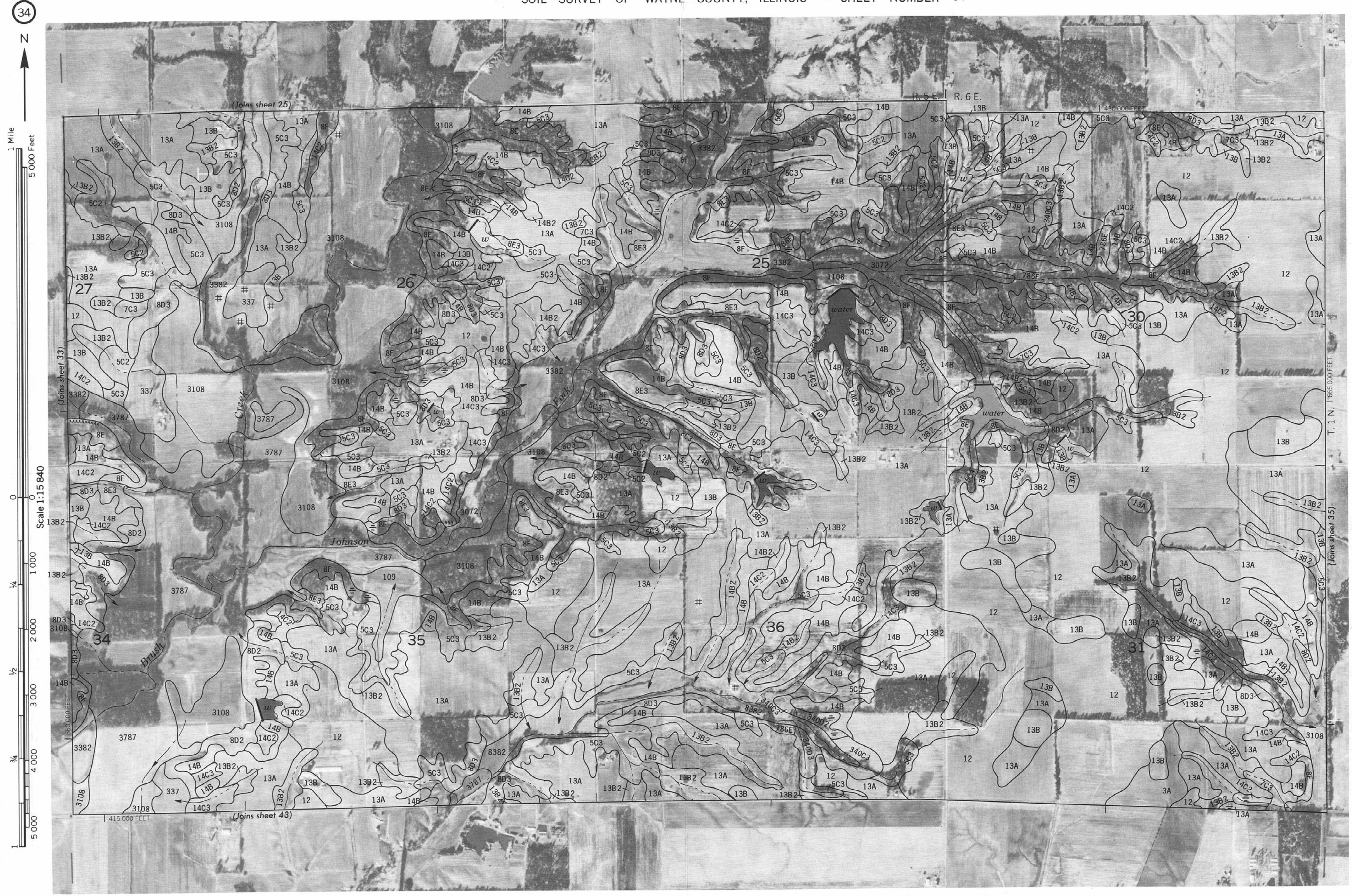
WAYNE COUNTY, ILLINOIS NO. 32

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



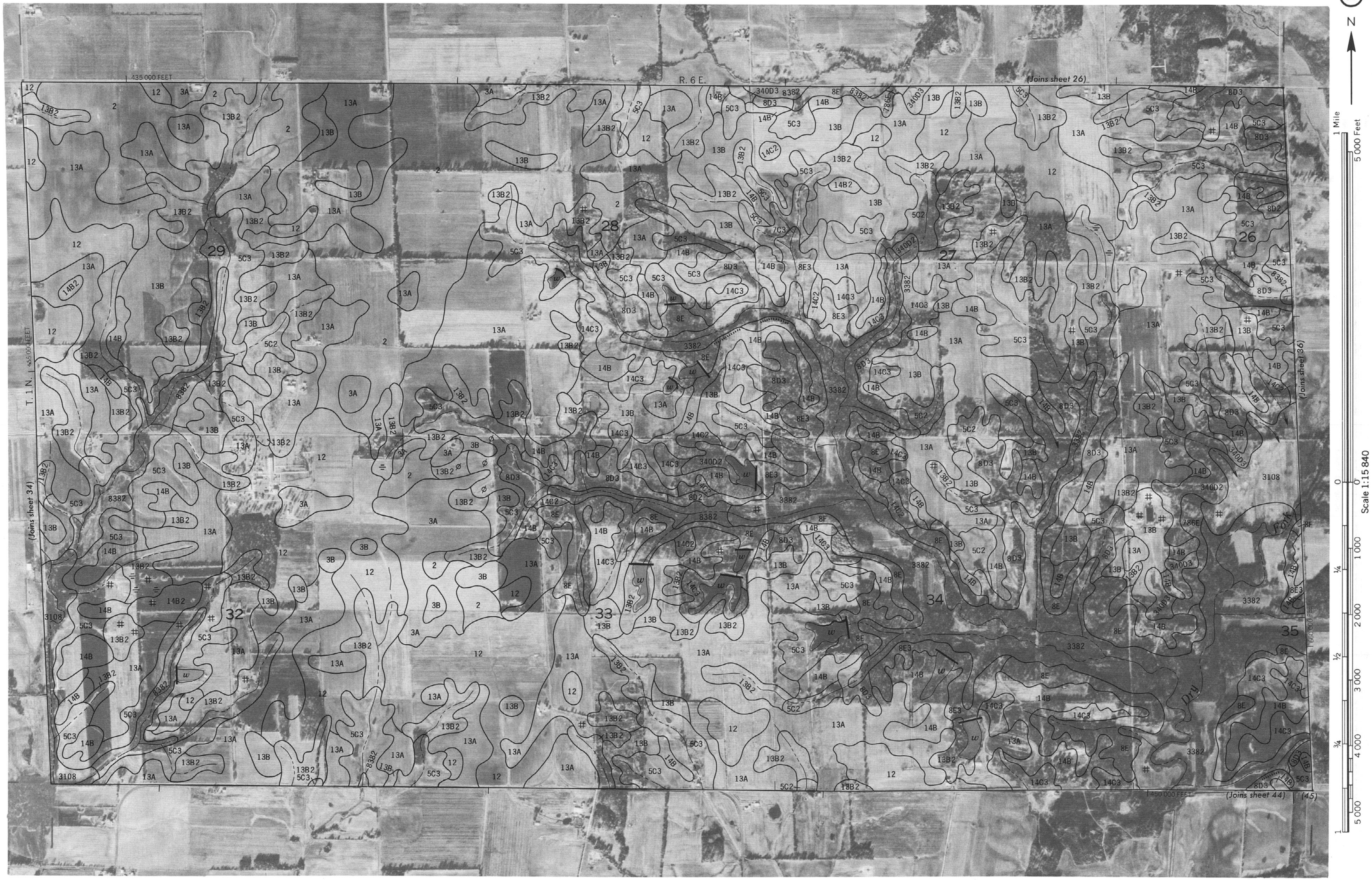
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 33



WAYNE COUNTY, ILLINOIS NO. 34

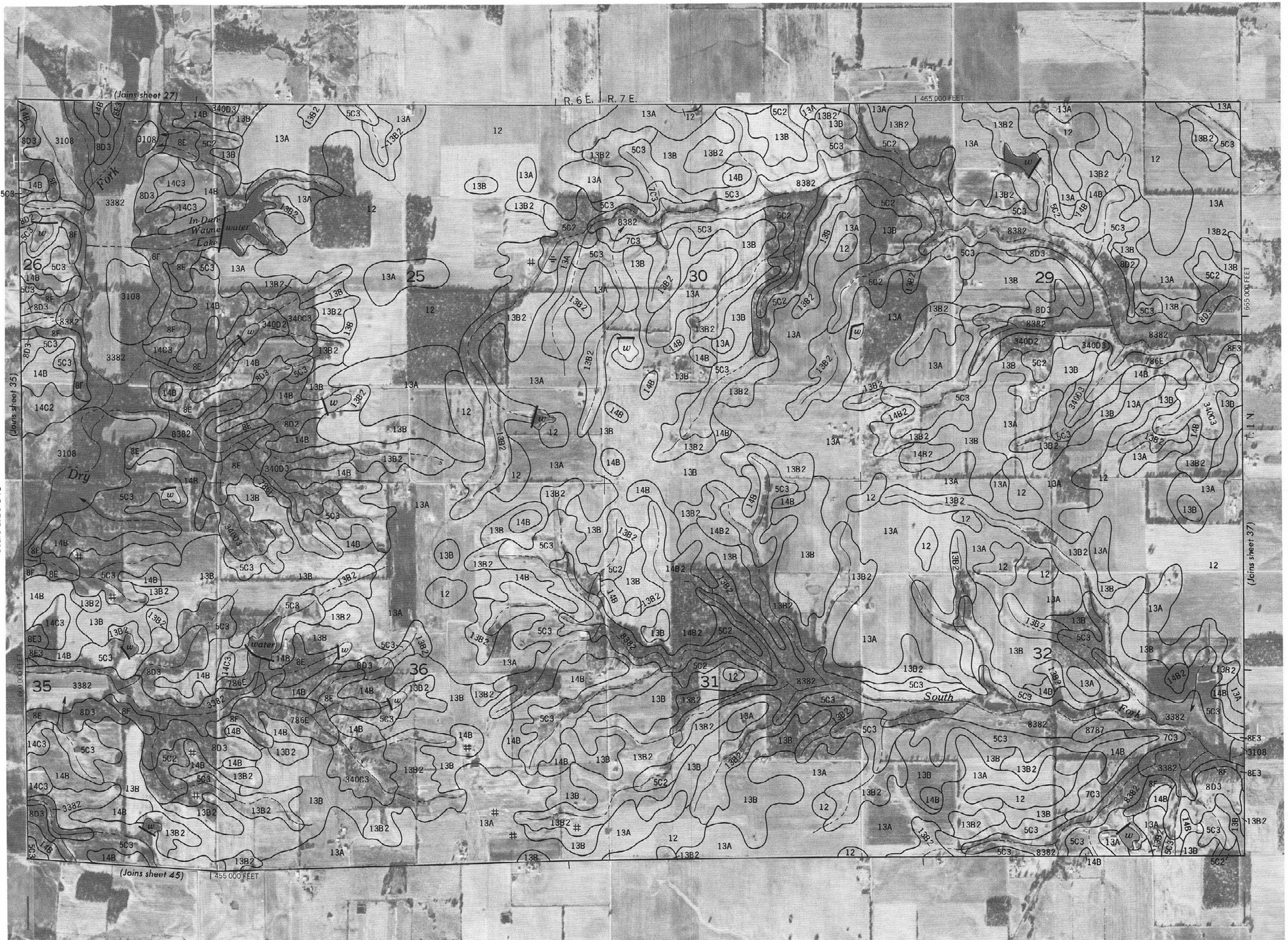
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



WAYNE COUNTY, ILLINOIS NO. 35

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL SURVEY OF WAYNE COUNTY, ILLINOIS — SHEET NUMBER 36



N

1 Mile
5 000 Feet
Scale 1:15 840
0 — ¼ — ½ — ¾ — 1
0 — 1 000 — 2 000 — 3 000 — 4 000 — 5 000

WAYNE COUNTY, ILLINOIS NO. 36

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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WAYNE COUNTY, ILLINOIS NO. 37

SOIL SURVEY OF WAYNE COUNTY, ILLINOIS — SHEET NUMBER 38

N

1 Mile
5 000 Feet
Scale 1:15 840
0 ¼ ½ ¾ 1
0 1 000 2 000 3 000 4 000 5 000

WAYNE COUNTY, ILLINOIS NO. 38

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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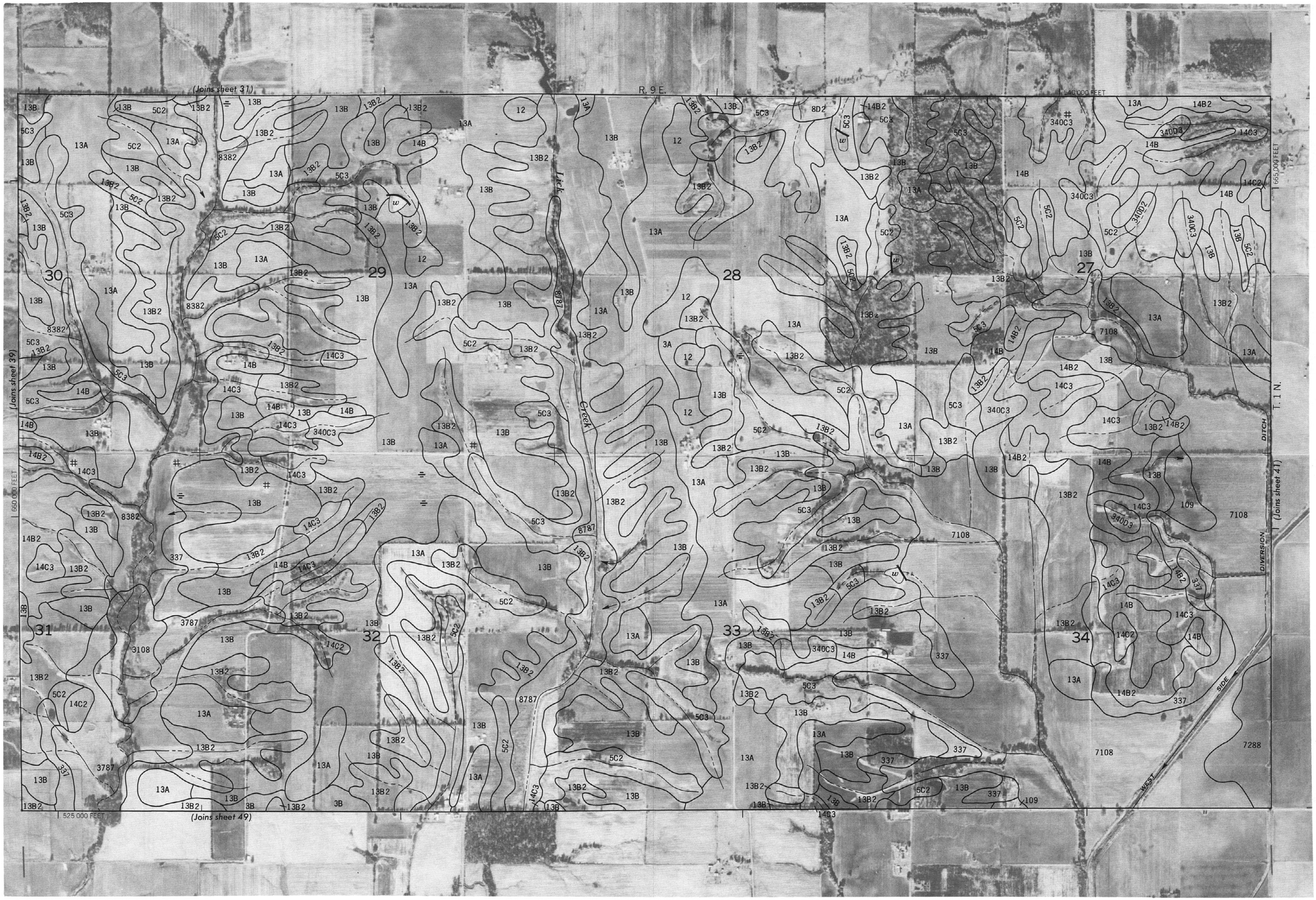
WAYNE COUNTY, ILLINOIS NO. 39

N

1 Mile

5 000 Feet

Scale 1:15 840



WAYNE COUNTY, ILLINOIS NO. 40

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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WAYNE COUNTY, ILLINOIS NO. 41

WAYNE COUNTY, ILLINOIS NO. 42

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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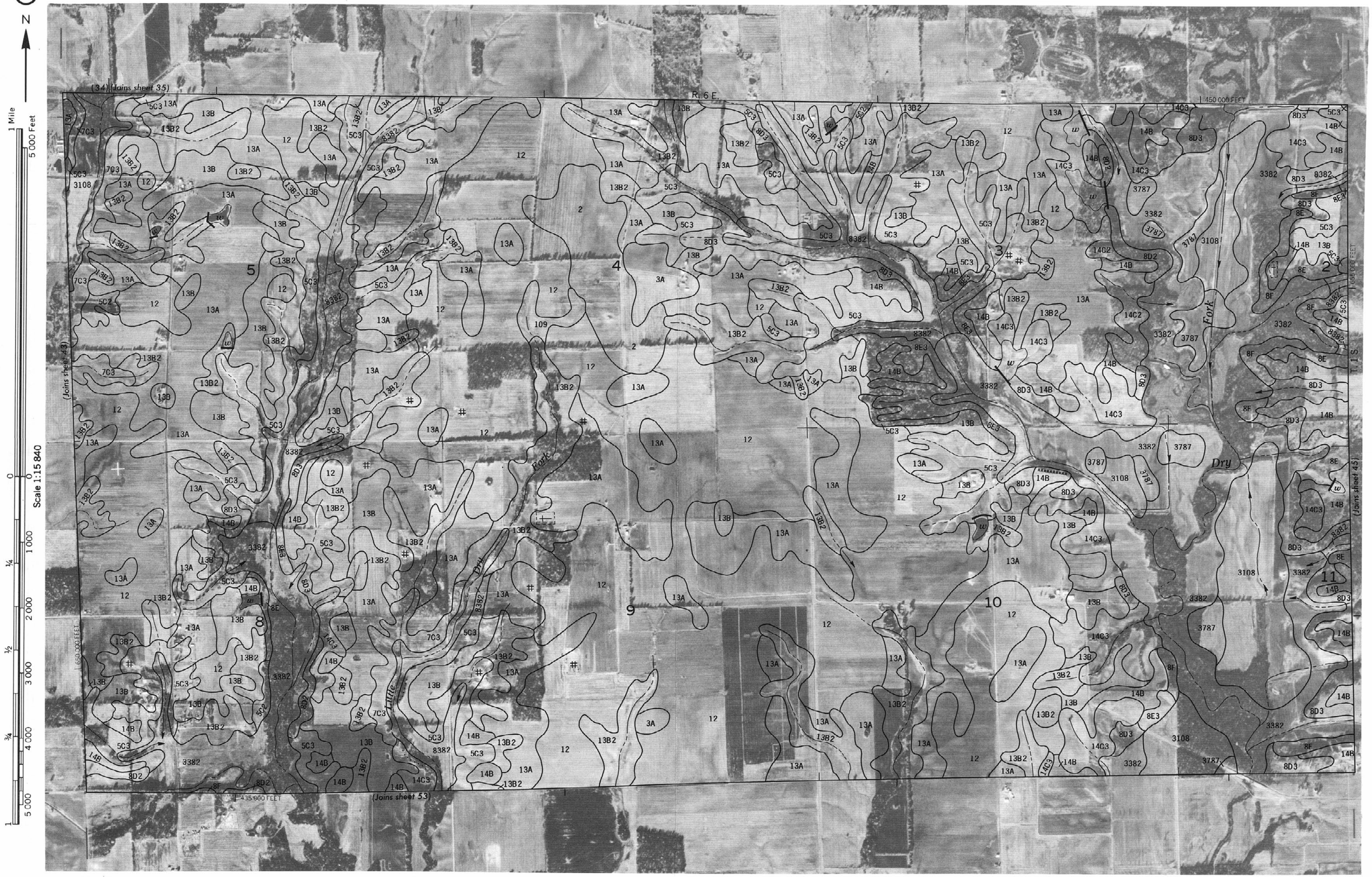
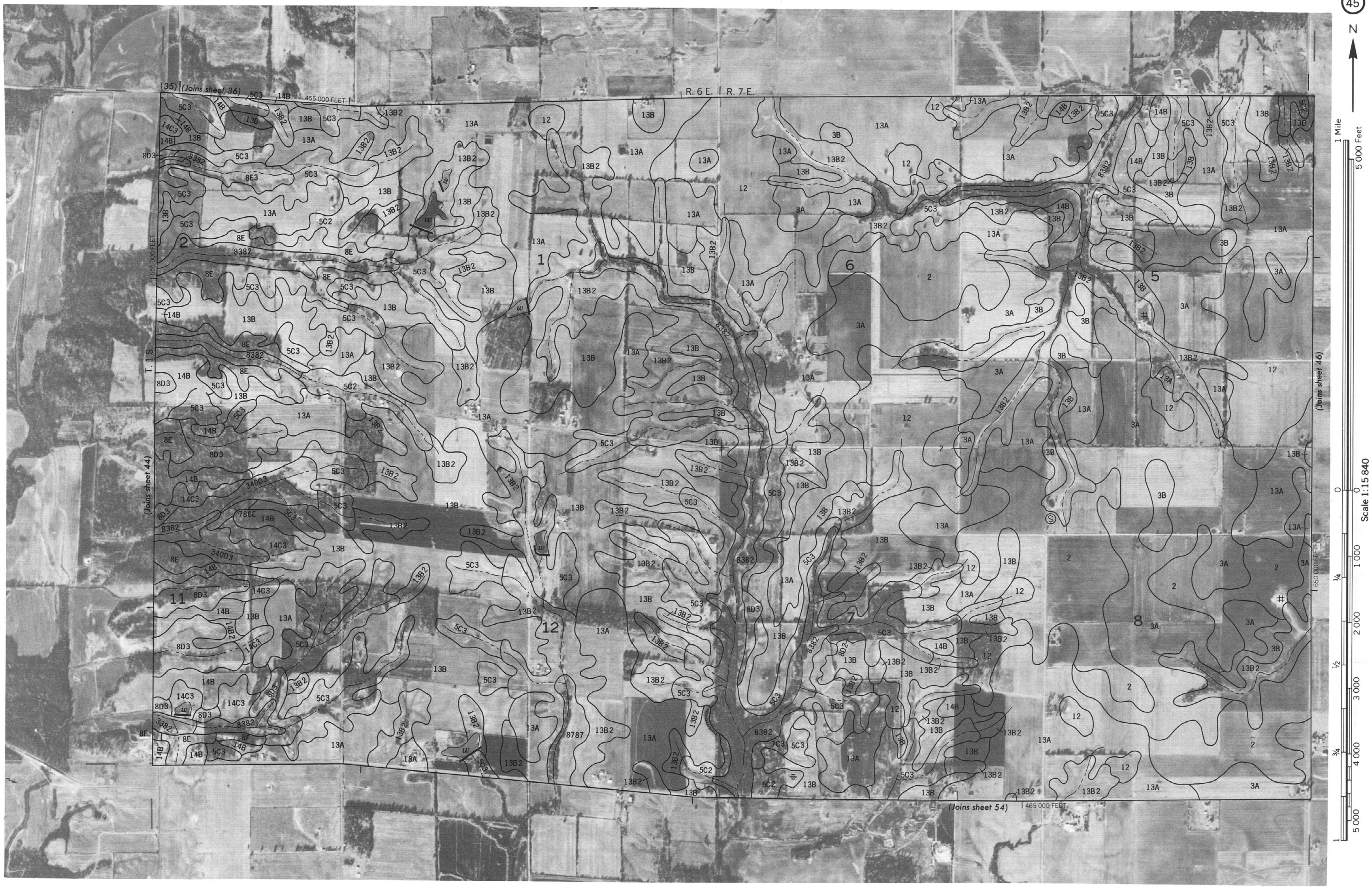
WAYNE COUNTY, ILLINOIS NO. 43

SOIL SURVEY OF WAYNE COUNTY, ILLINOIS — SHEET NUMBER 44



WAYNE COUNTY, ILLINOIS NO. 44

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 45

WAYNE COUNTY, ILLINOIS NO. 46

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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WAYNE COUNTY, ILLINOIS NO. 47

WAYNE COUNTY, ILLINOIS NO. 48

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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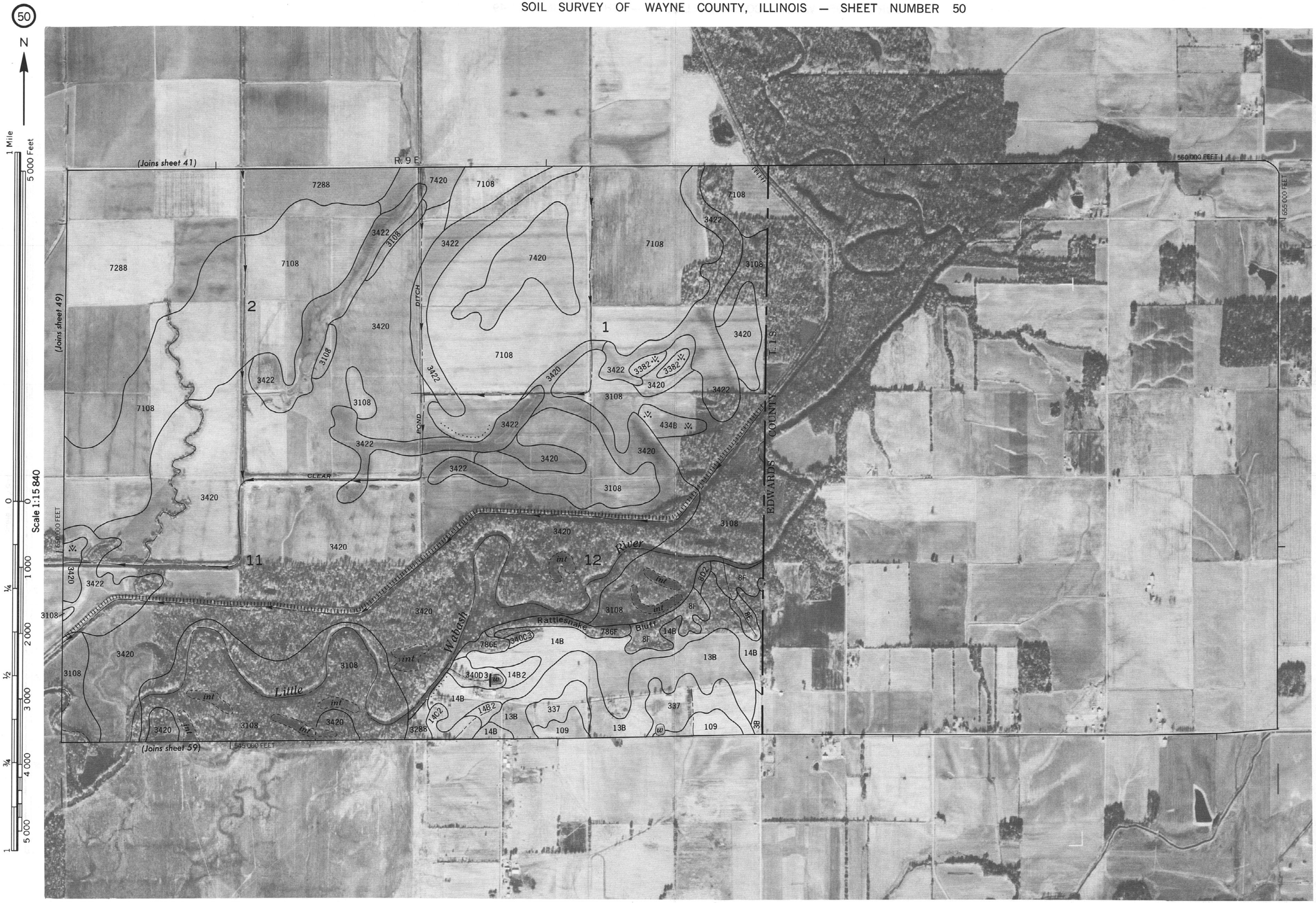
WAYNE COUNTY, ILLINOIS NO. 49



WAYNE COUNTY, ILLINOIS NO. 50

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 51

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile

5 000 Feet

Scale 1:15 840

0

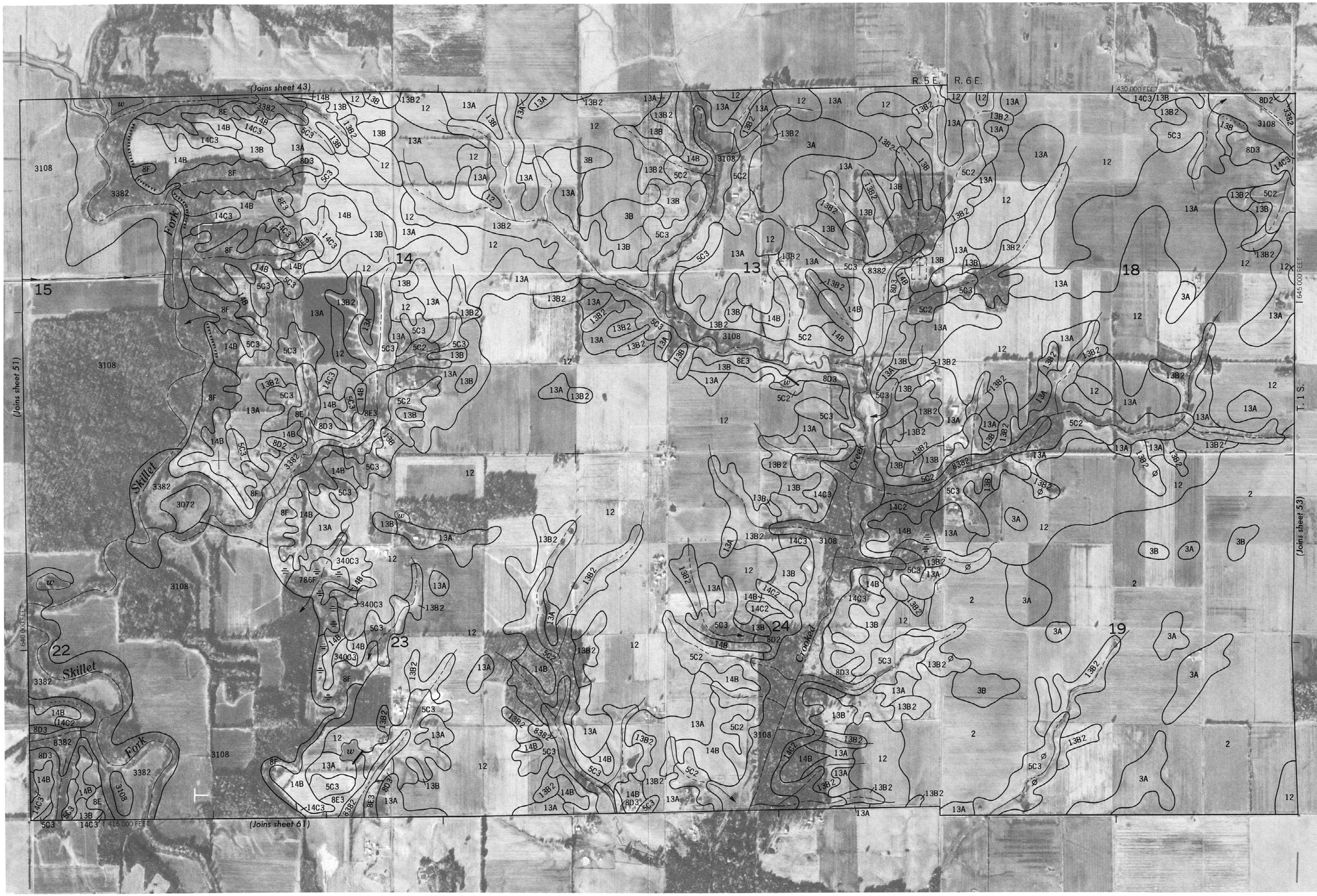
1/4

1/2

3/4

1

0 1 000 2 000 3 000 4 000 5 000



WAYNE COUNTY, ILLINOIS NO. 52

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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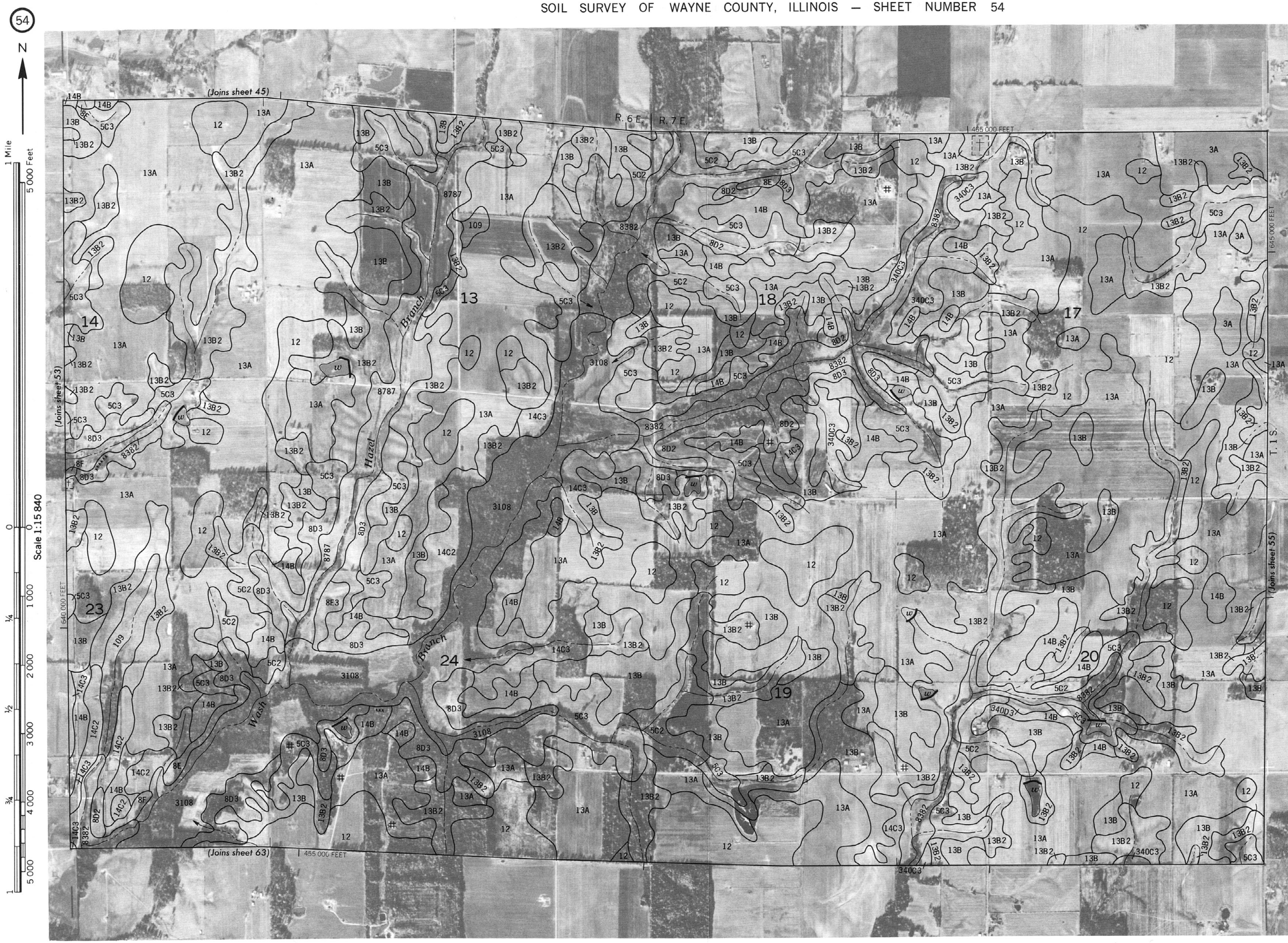
WAYNE COUNTY, ILLINOIS NO. 53



WAYNE COUNTY, ILLINOIS NO. 54

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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WAYNE COUNTY, ILLINOIS NO. 55

WAYNE COUNTY, ILLINOIS NO. 56

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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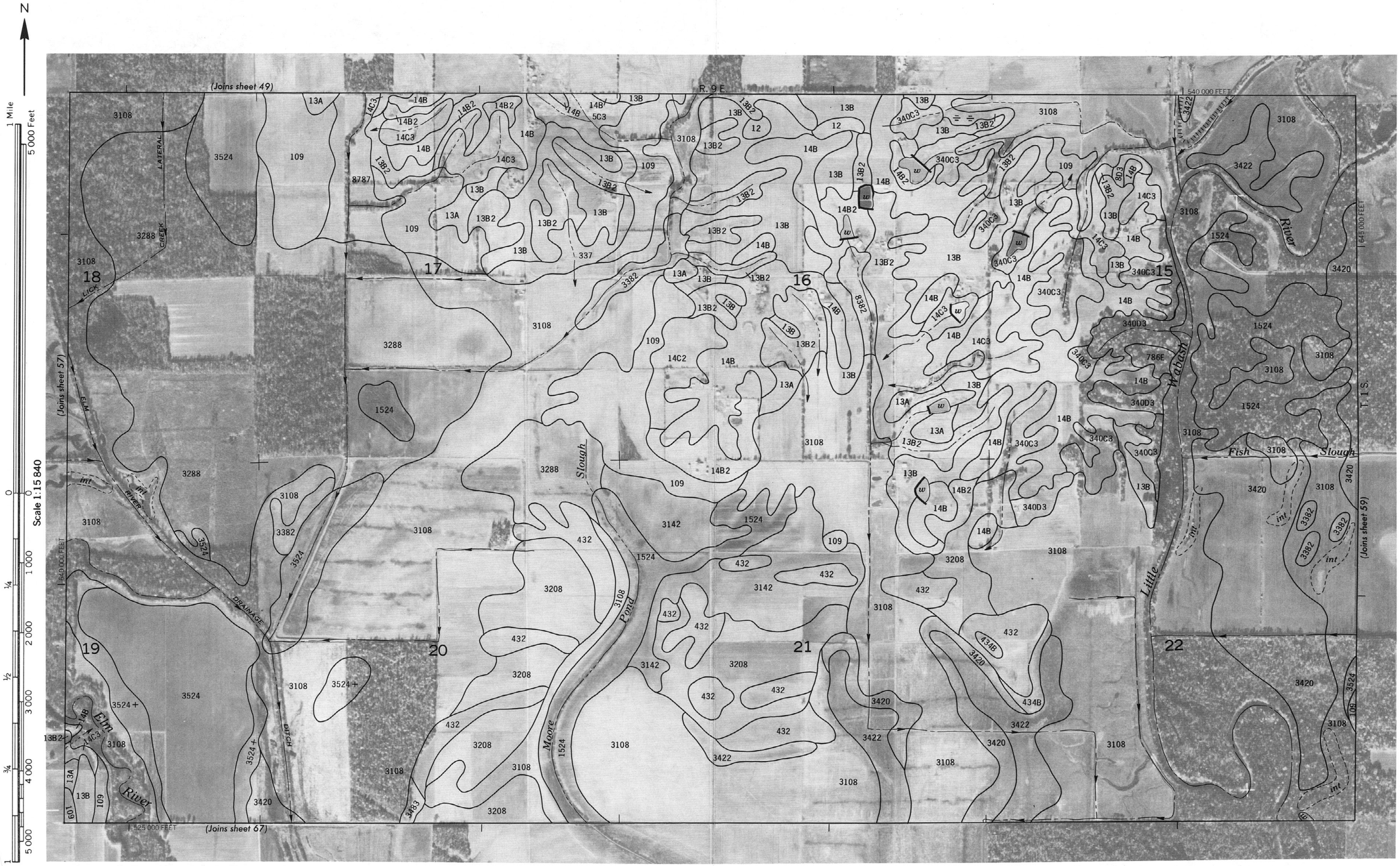
WAYNE COUNTY, ILLINOIS NO. 57

SOIL SURVEY OF WAYNE COUNTY, ILLINOIS — SHEET NUMBER 58



WAYNE COUNTY, ILLINOIS NO. 58

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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SOIL SURVEY OF WAYNE COUNTY, ILLINOIS — SHEET NUMBER 60

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

WAYNE COUNTY, ILLINOIS NO. 60

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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WAYNE COUNTY, ILLINOIS NO. 61

N

1 Mile
5 000 Feet
Scale 1:15 840

WAYNE COUNTY, ILLINOIS NO. 62

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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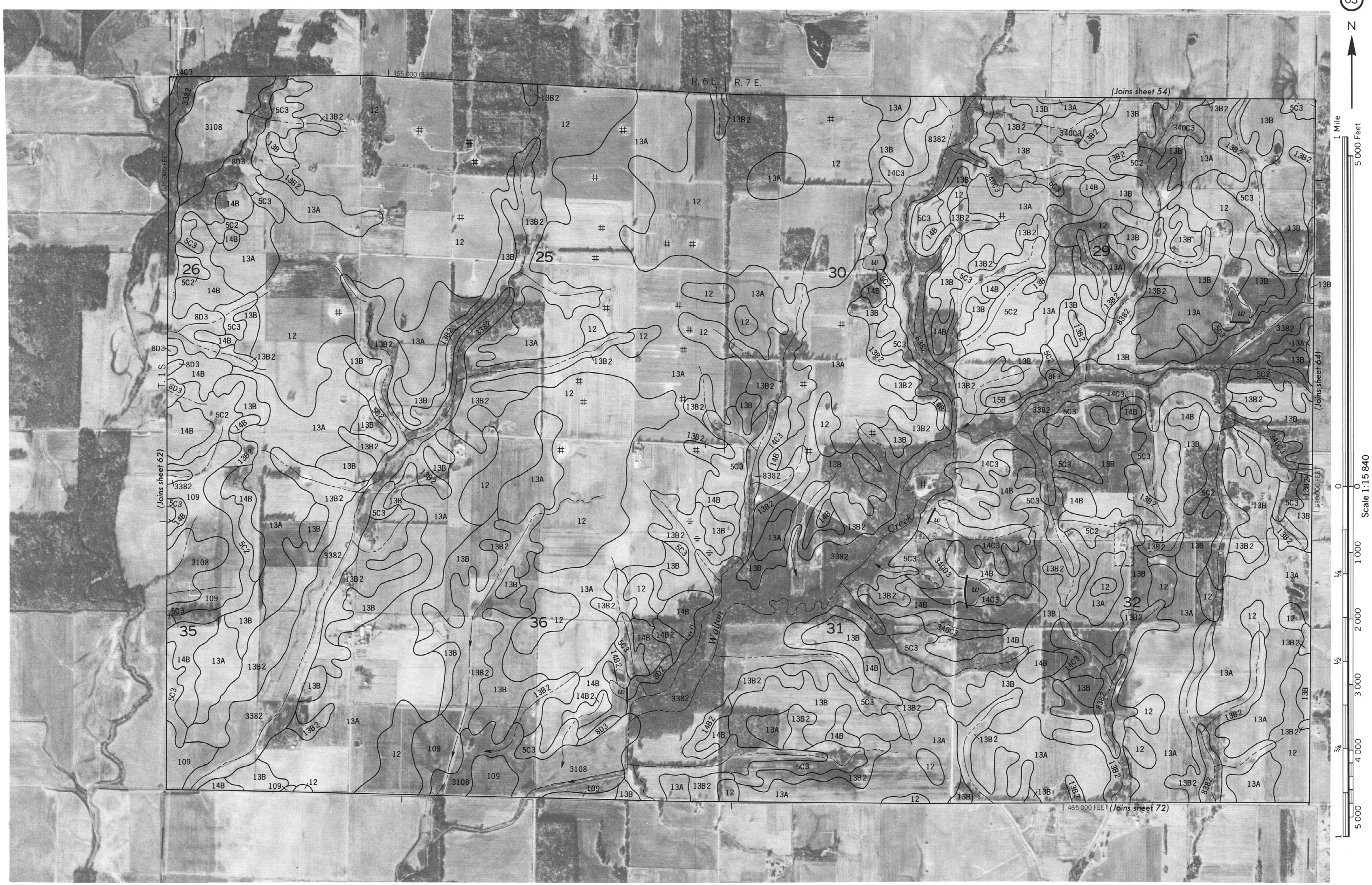
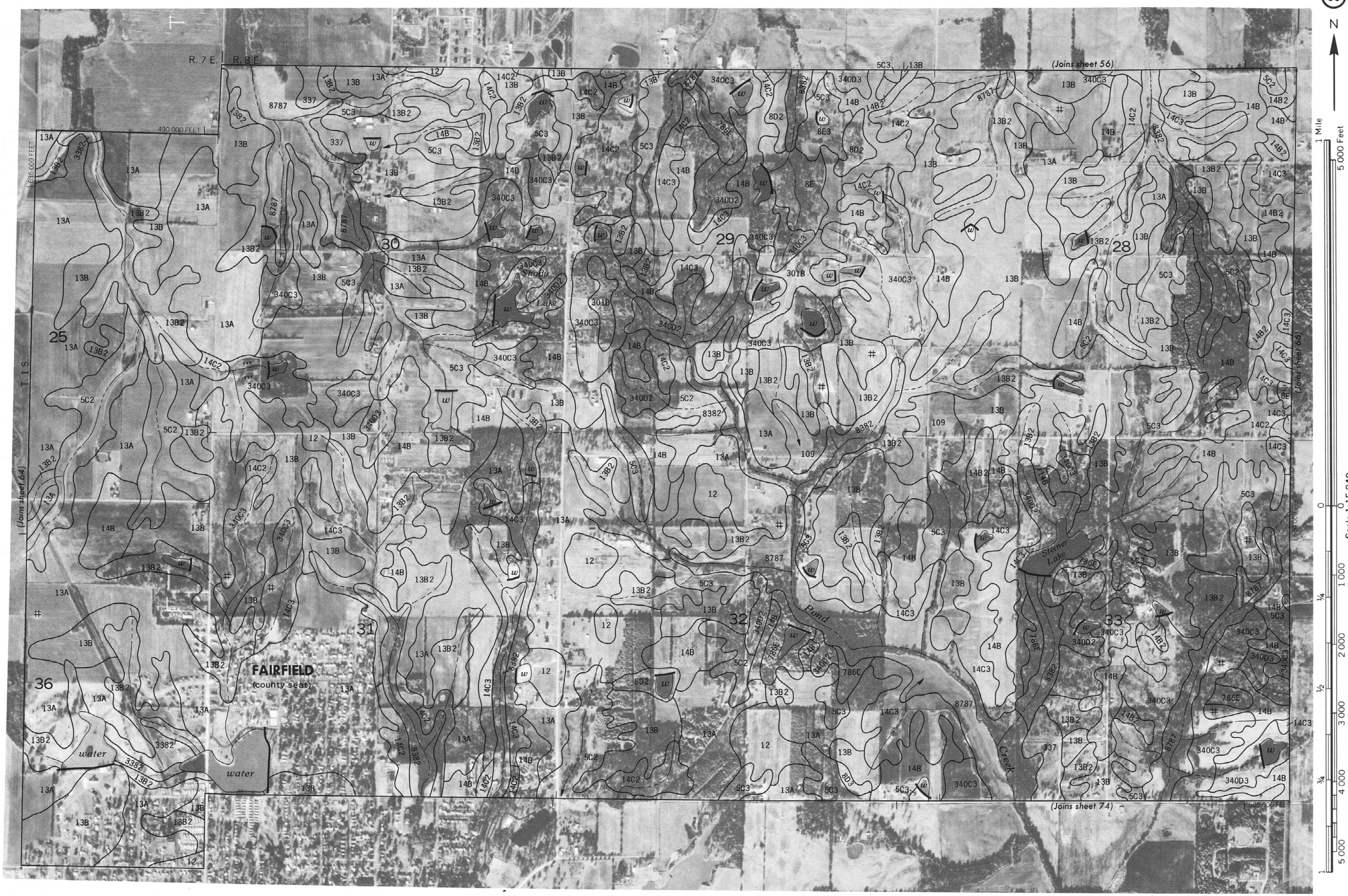
WAYNE COUNTY, ILLINOIS NO. 63



WAYNE COUNTY, ILLINOIS NO. 64

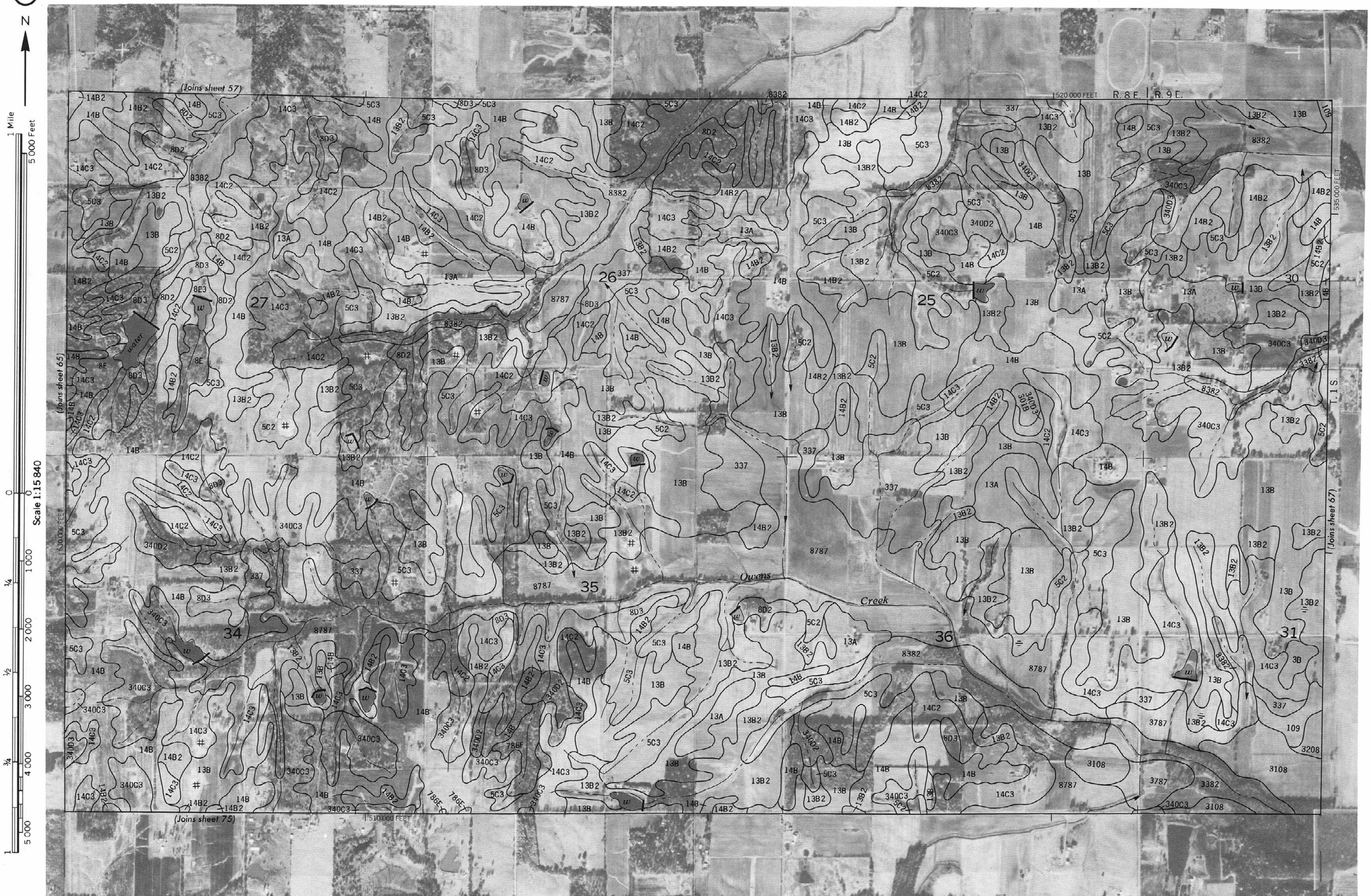
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

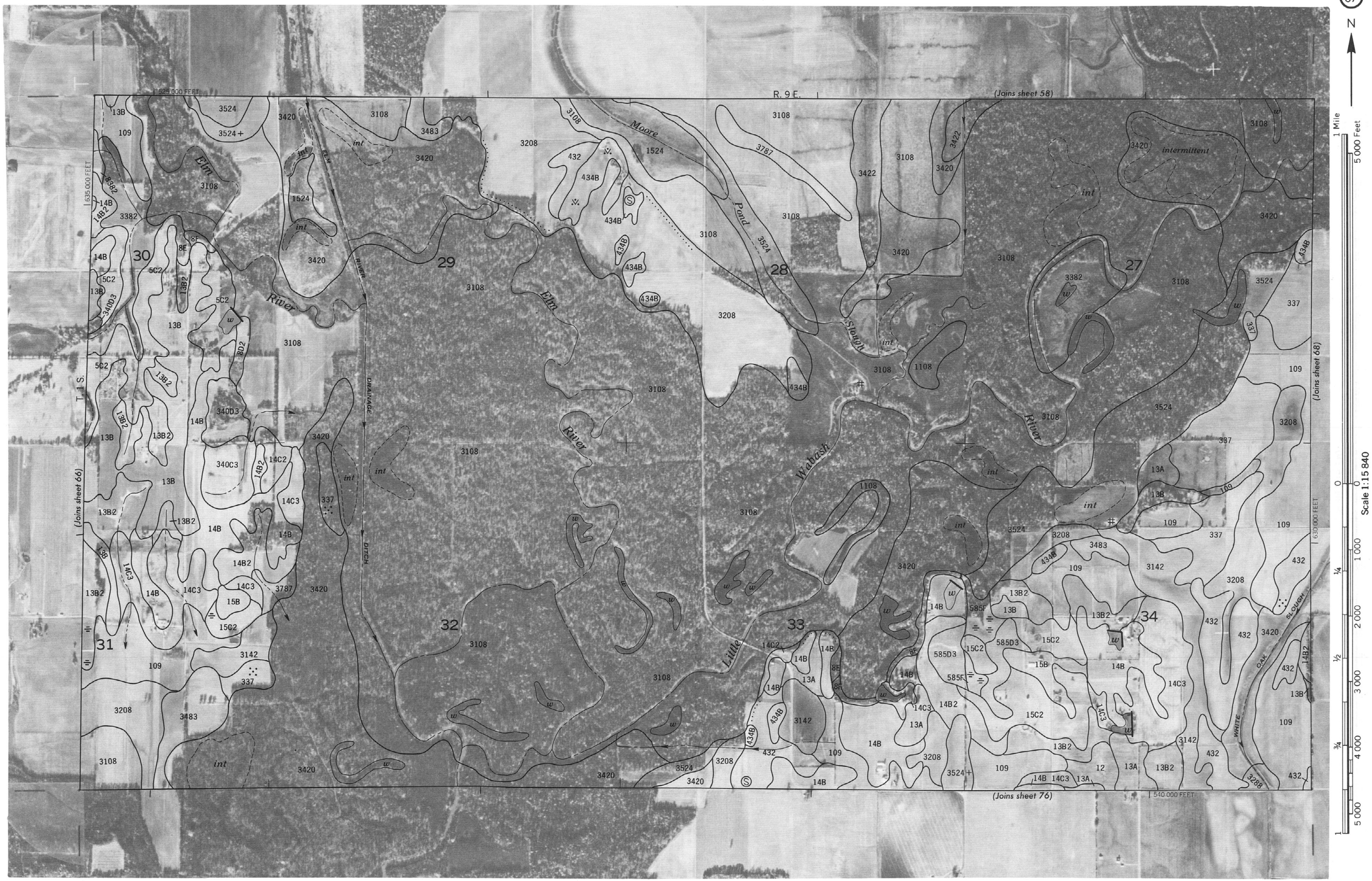
WAYNE COUNTY, ILLINOIS NO. 65

SOIL SURVEY OF WAYNE COUNTY, ILLINOIS — SHEET NUMBER 66



WAYNE COUNTY, ILLINOIS NO. 66

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 67

WAYNE COUNTY, ILLINOIS NO. 68

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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70

WAYNE COUNTY, ILLINOIS NO. 70

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

71

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 71

N

Scale 1:15 840

1 Mile

5 000 Feet

0 1000 2000 3000 4000 5000 Feet

0 ¼ ½ ¾ 1 Mile

SOIL SURVEY OF WAYNE COUNTY, ILLINOIS — SHEET NUMBER 72

N

Scale 1:15 840

1 Mile

5 000 Feet

WAYNE COUNTY, ILLINOIS NO. 72

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

73

N

1 Mile

5 000 Feet

Scale 1:15 840

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

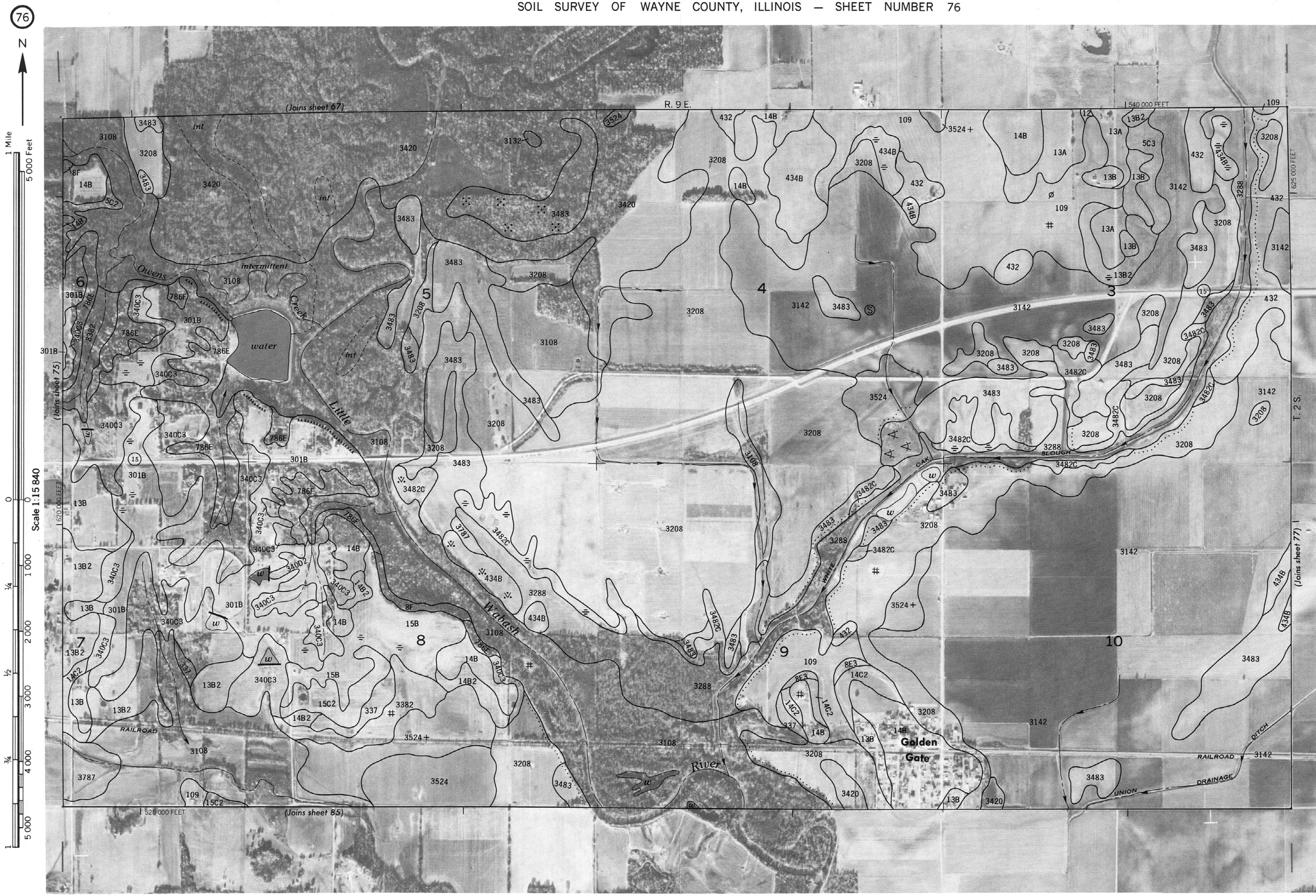
WAYNE COUNTY, ILLINOIS NO. 73

WAYNE COUNTY, ILLINOIS NO. 74

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 75

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



WAYNE COUNTY, ILLINOIS NO. 76

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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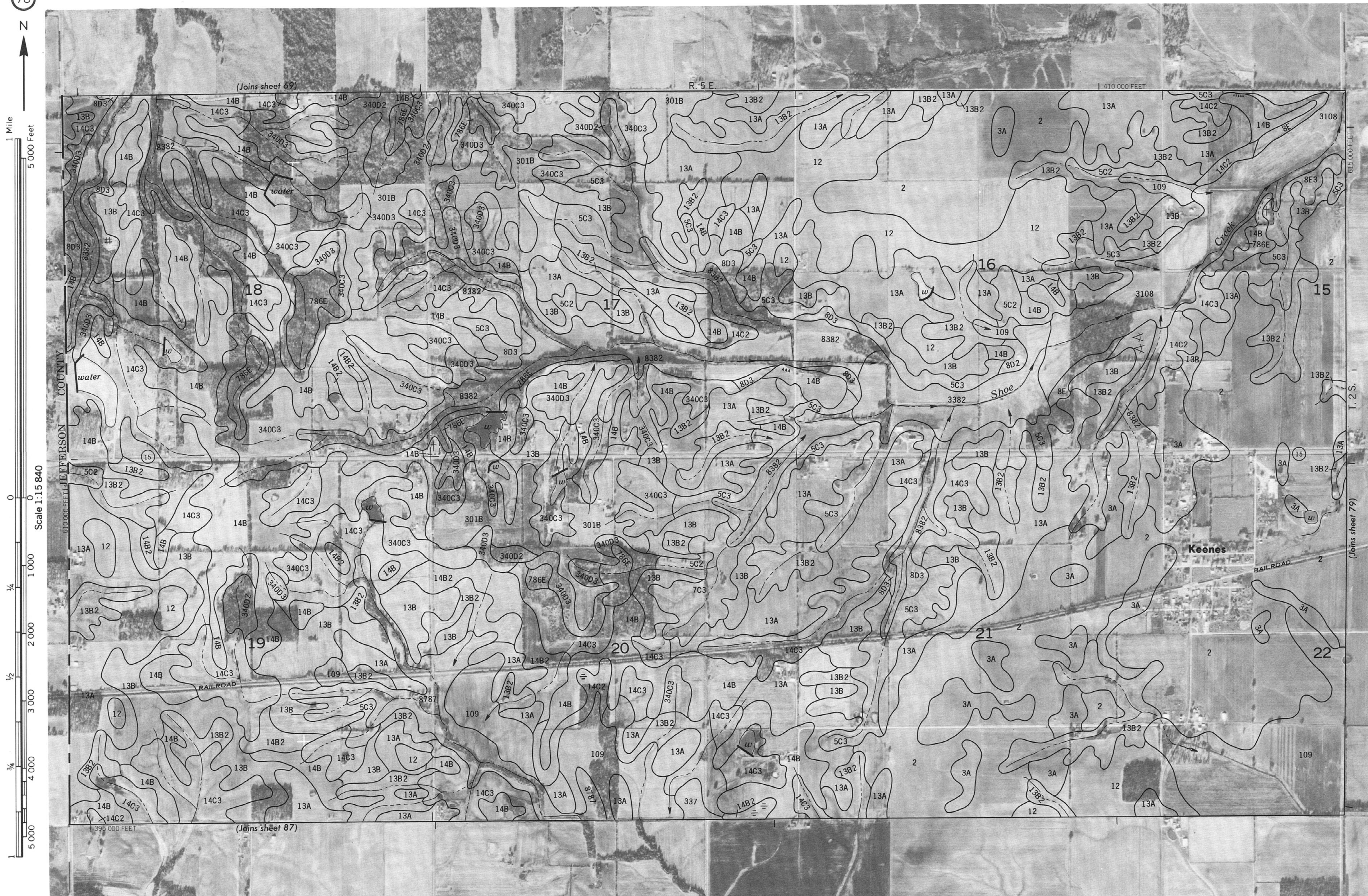
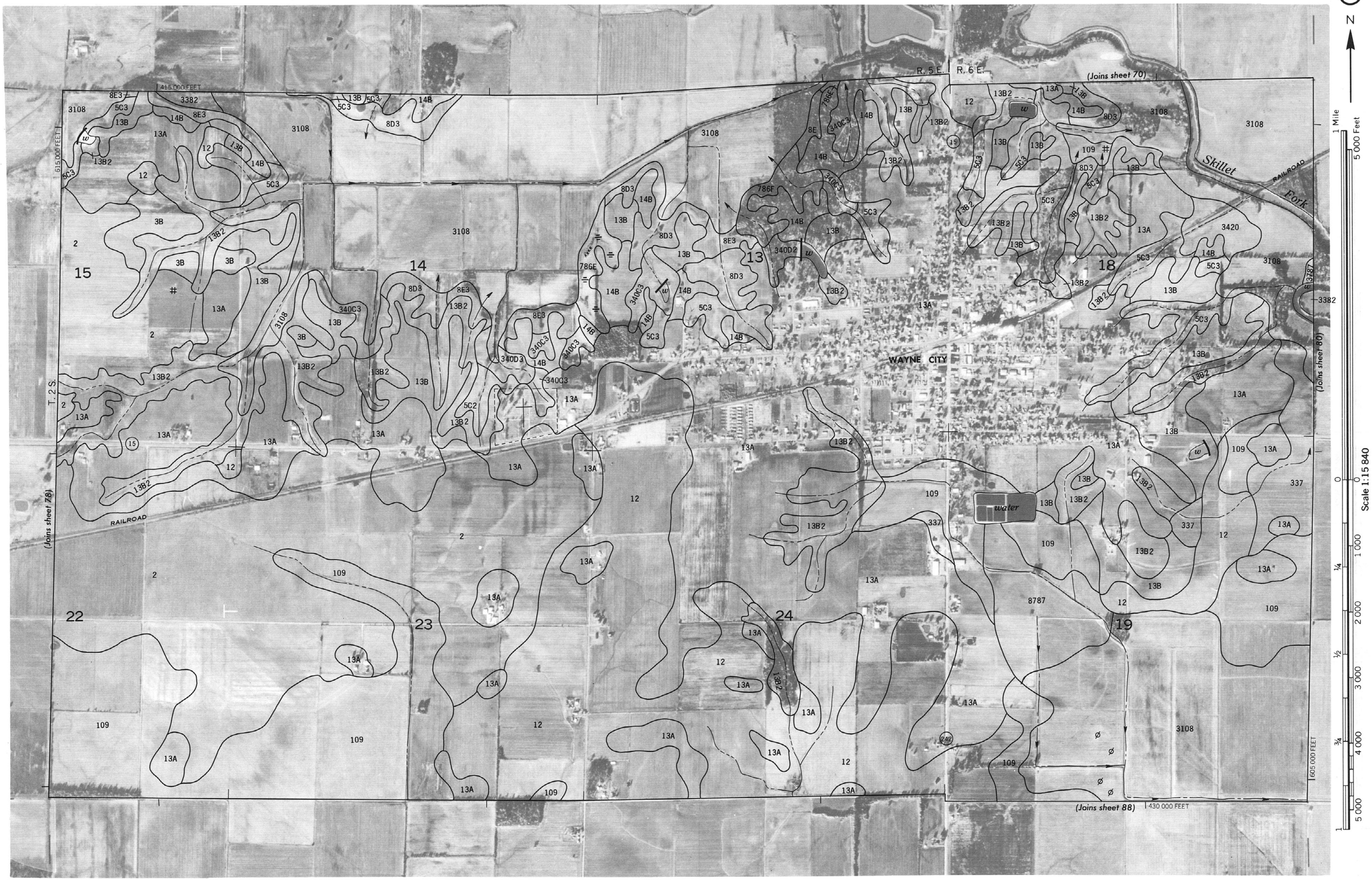


WAYNE COUNTY, ILLINOIS NO. 78

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



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WAYNE COUNTY, ILLINOIS NO. 79

WAYNE COUNTY, ILLINOIS NO. 80

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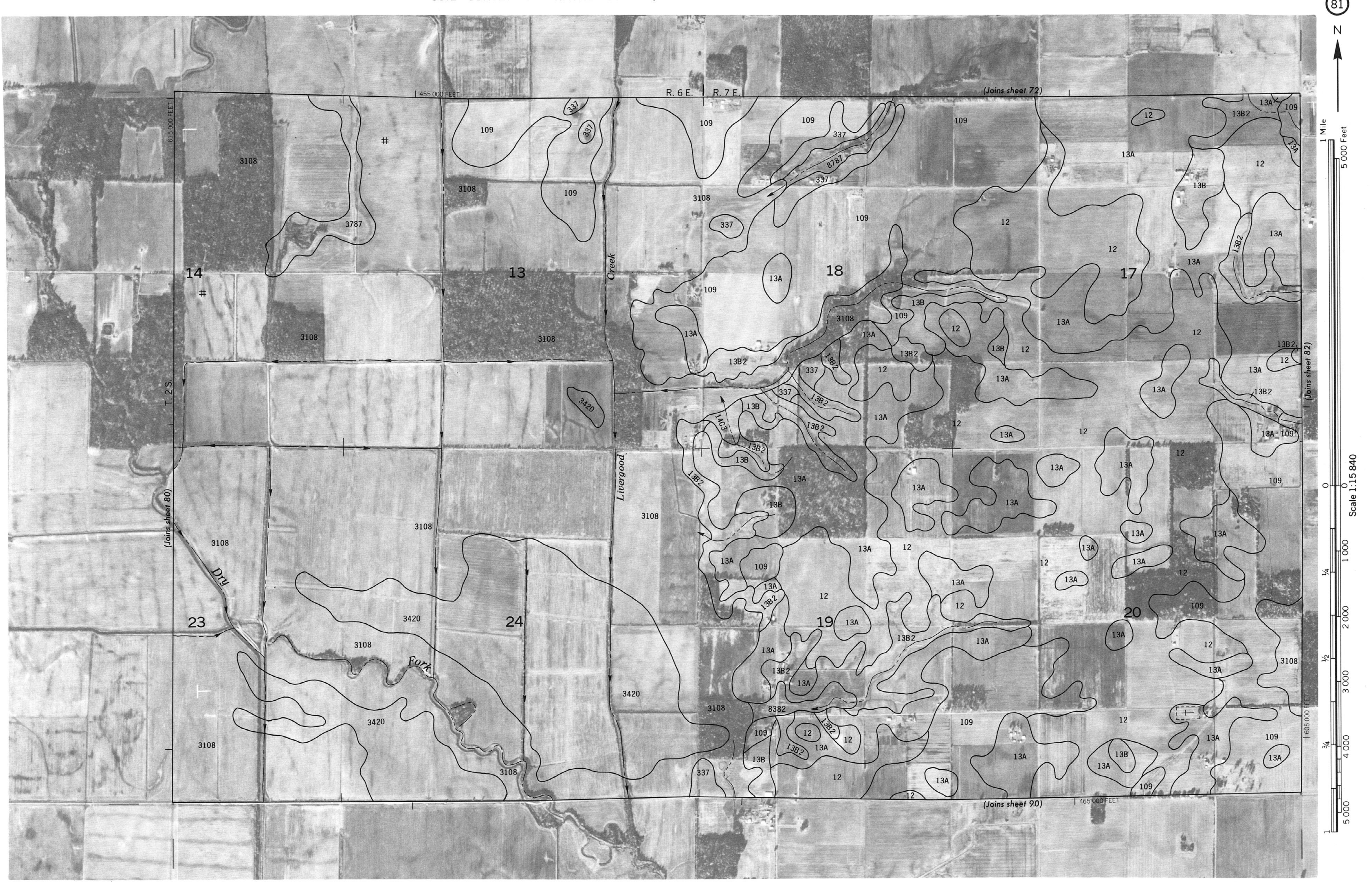

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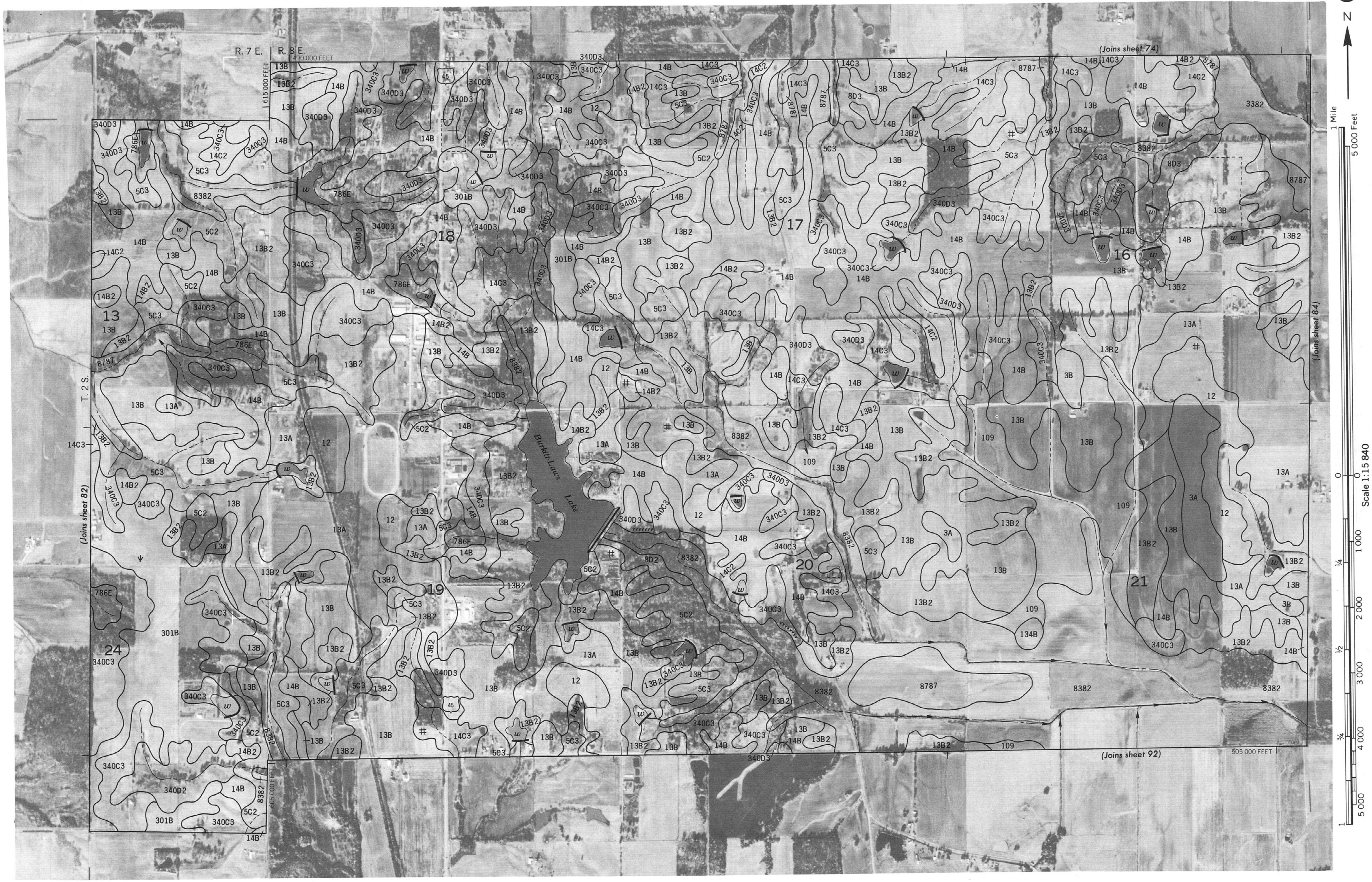
WAYNE COUNTY, ILLINOIS NO. 81

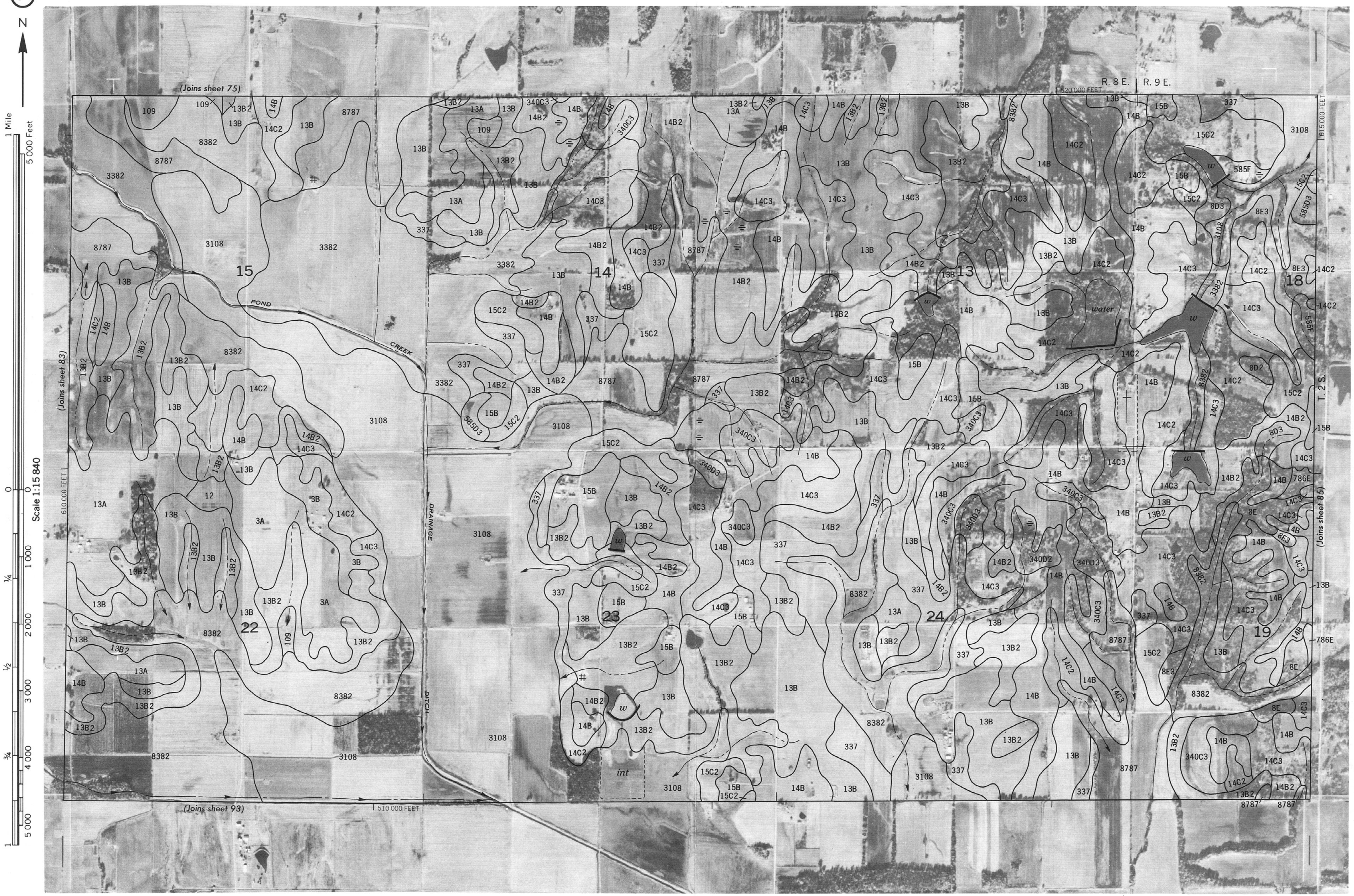
WAYNE COUNTY, ILLINOIS NO. 82

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 83



WAYNE COUNTY, ILLINOIS NO. 84

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 85

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WAYNE COUNTY, ILLINOIS NO. 86

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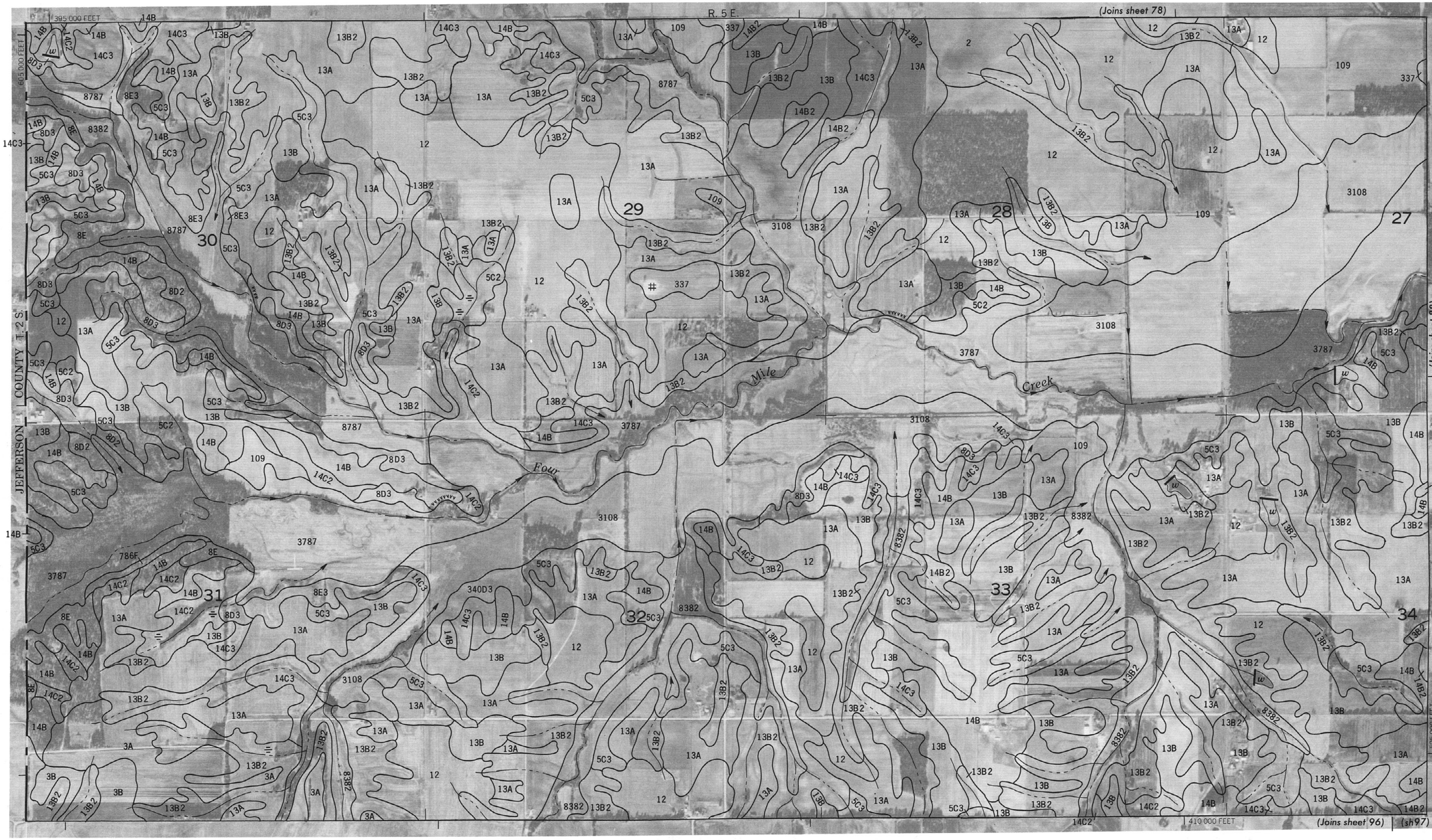
N

1 Mile

5 000 Feet



0 1000 2000 3000 4000 5000

0 ¼ ½ ¾ 1

Scale 1:15 840

WAYNE COUNTY, ILLINOIS NO. 87

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile
5 000 Feet
0
0
1 000
¼
2 000
½
3 000
¾
4 000
5 000
1

Scale 1:15 840

WAYNE COUNTY, ILLINOIS NO. 88

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WAYNE COUNTY, ILLINOIS NO. 89

WAYNE COUNTY, ILLINOIS NO. 90

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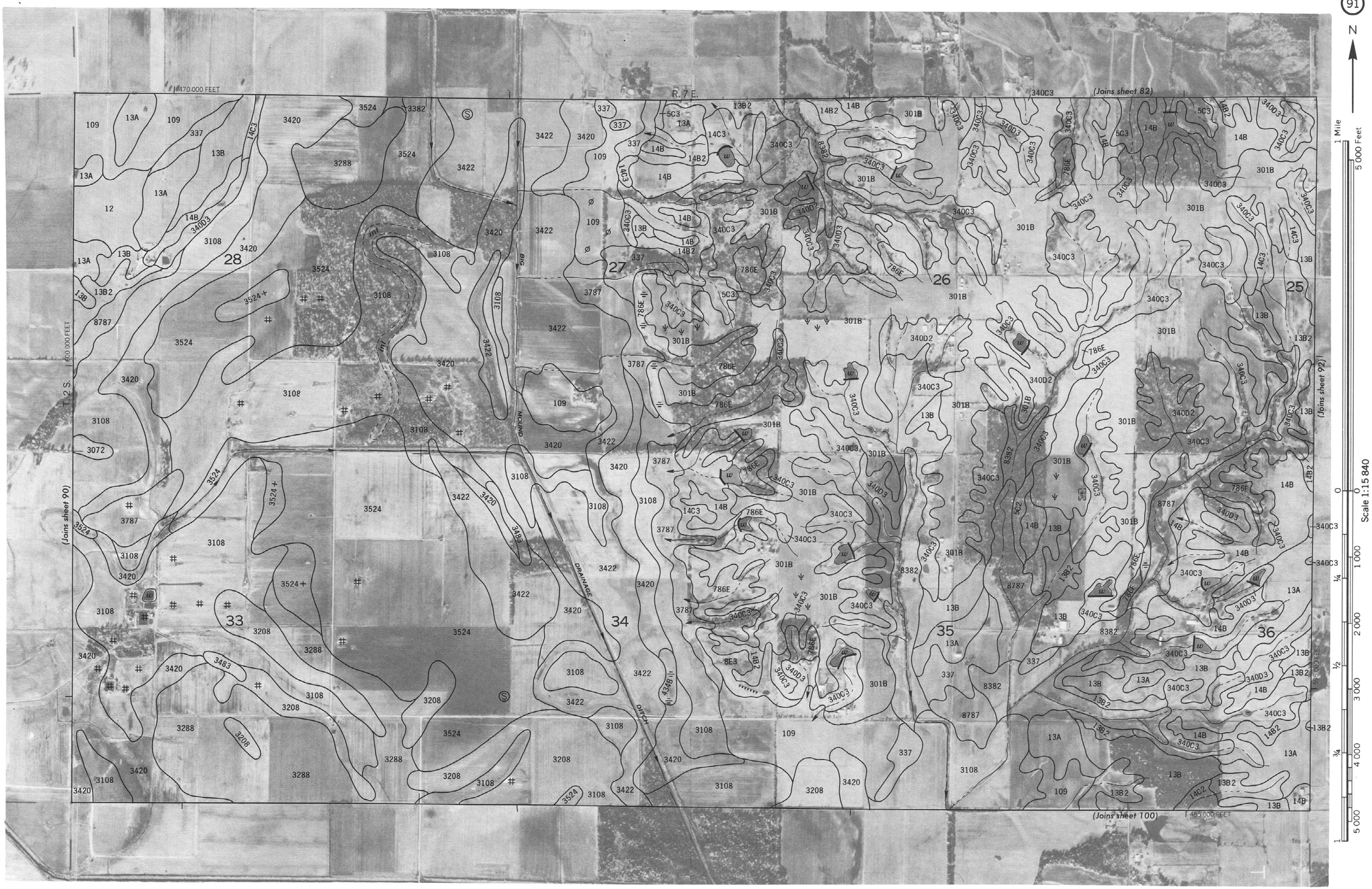
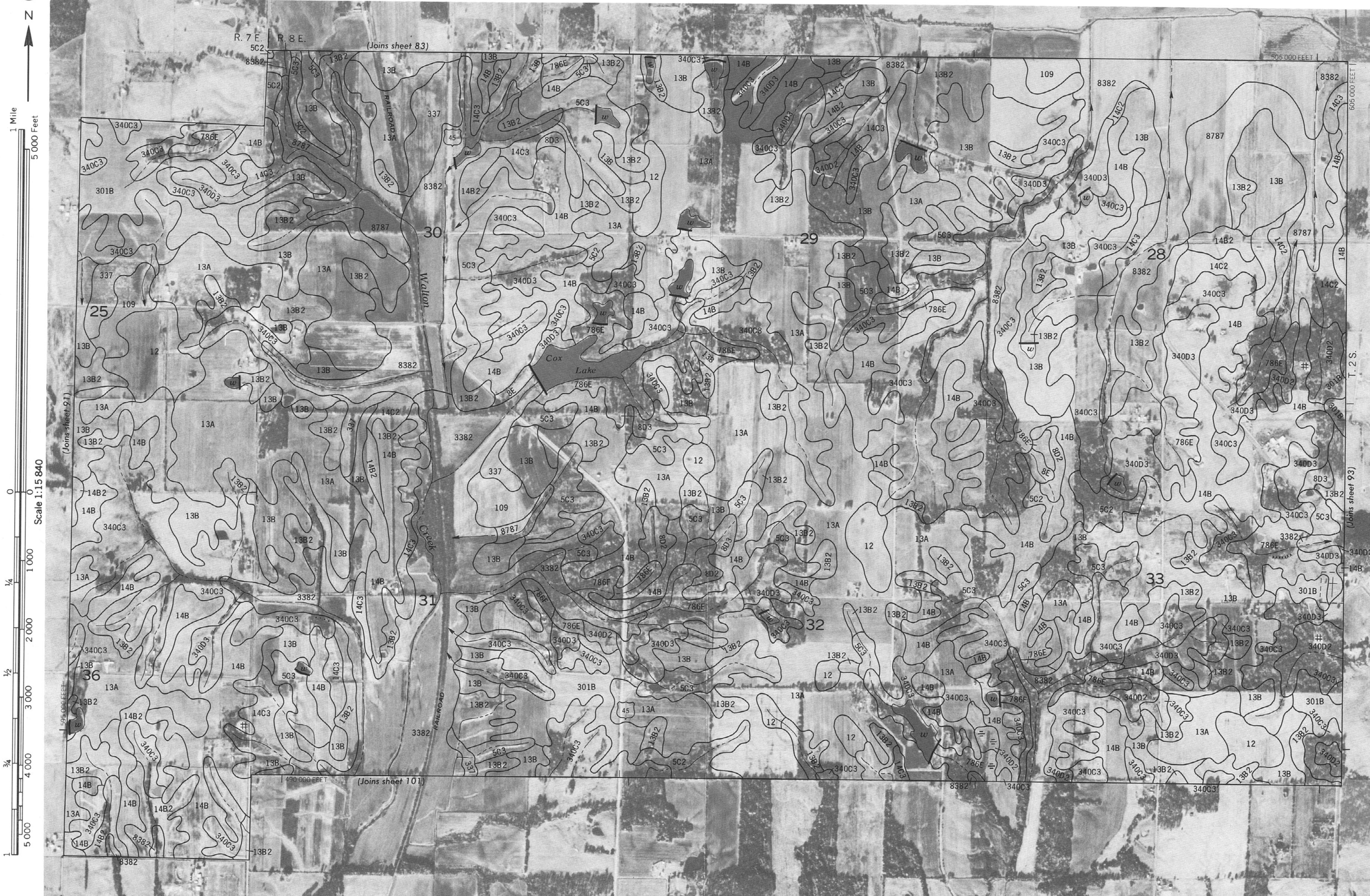


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 91



WAYNE COUNTY, ILLINOIS NO. 92

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 93

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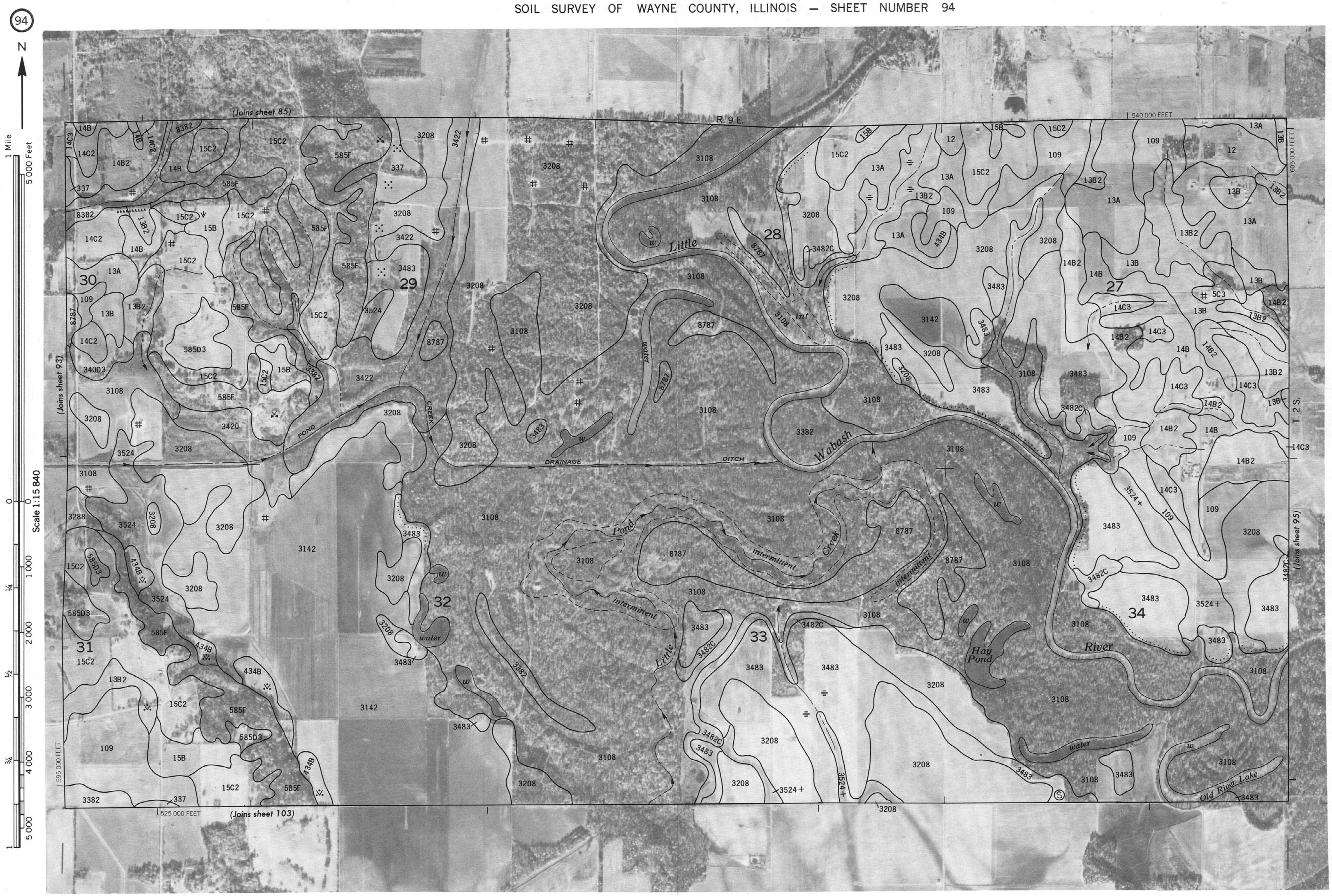
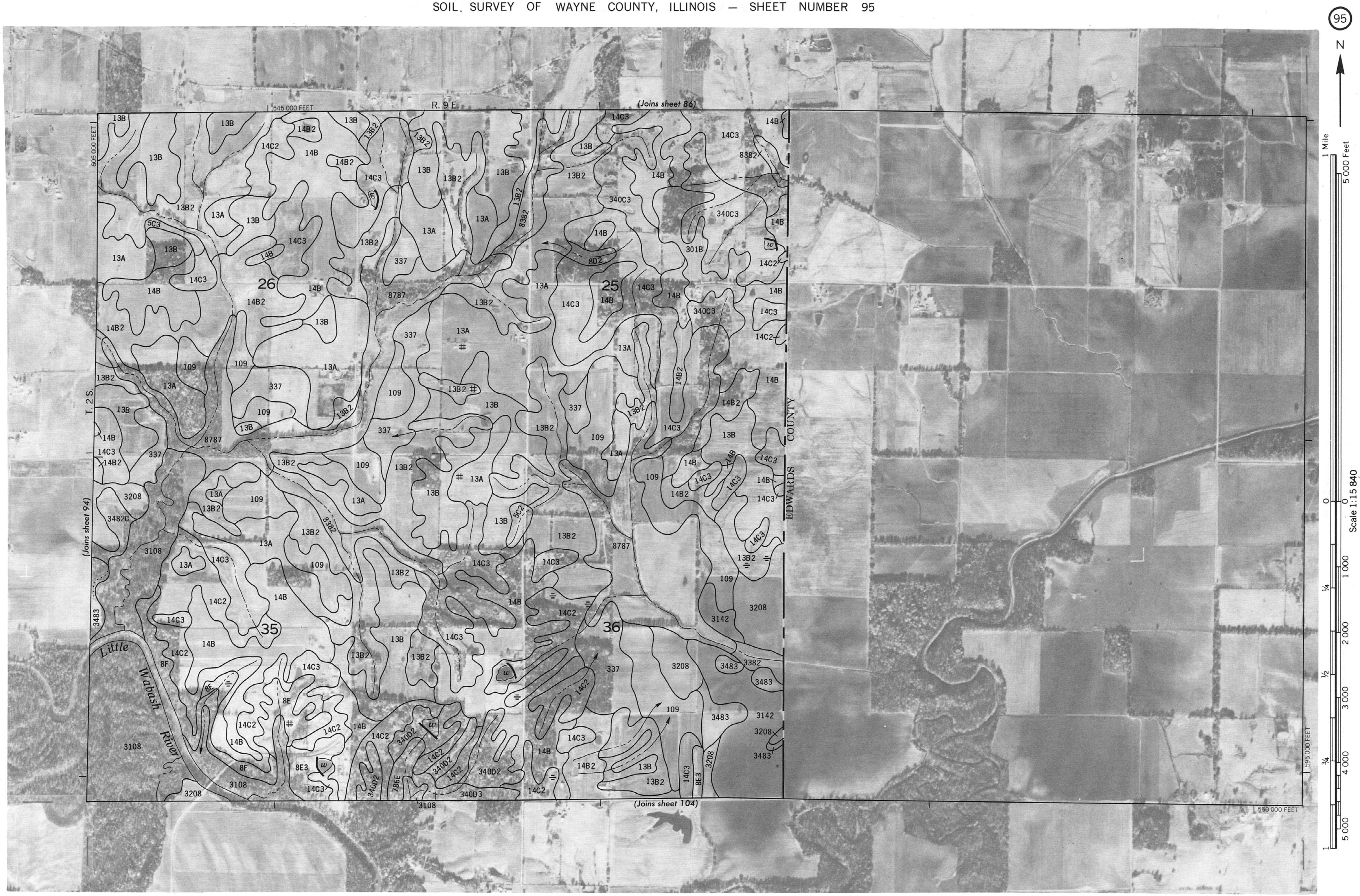


WAYNE COUNTY, ILLINOIS NO. 94

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



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WAYNE COUNTY, ILLINOIS NO. 95

96

N

1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000
1/4
1/2
3/4
1
Scale 1:15 840

WAYNE COUNTY, ILLINOIS NO. 96

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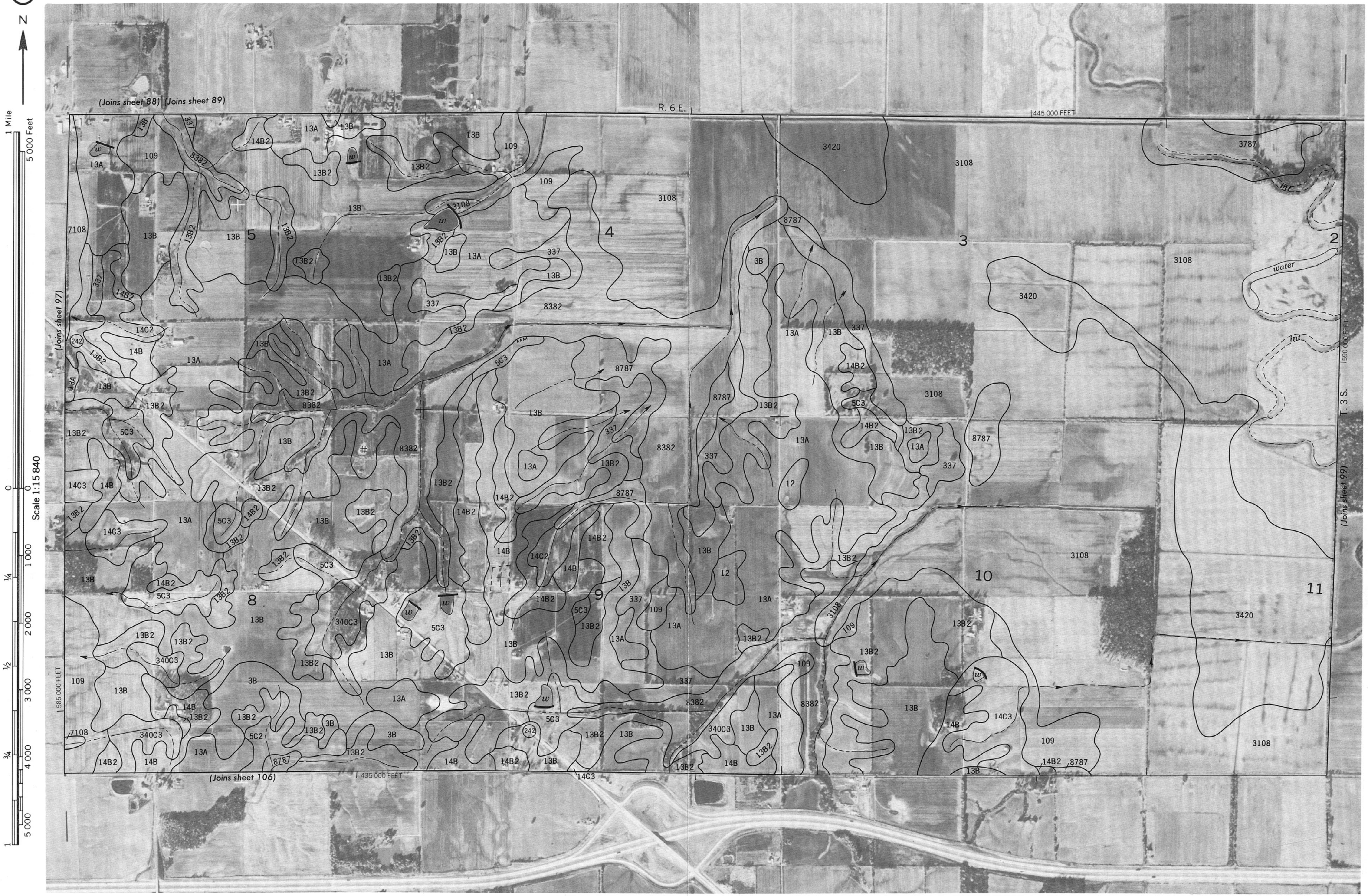

WAYNE COUNTY, ILLINOIS NO. 98

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

99

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

WAYNE COUNTY, ILLINOIS NO. 99